

FISCAL YEAR 2006  
MONITORING AND  
EVALUATION REPORT

# Land and Resource Management Plan

September 2007



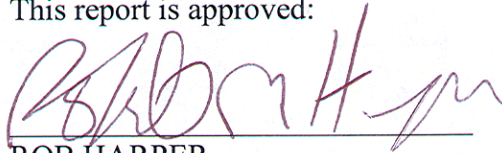
Chippewa National Forest

## FISCAL YEAR 2006 MONITORING AND EVALUATION REPORT

### APPROVAL AND DECLARATION OF INTENT

I have reviewed the FY 2006 Monitoring and Evaluation Report for the Chippewa National Forest that was prepared during FY 2006. The Monitoring and Evaluation Report meets the intent of both the Forest Plan (Chapter IV) as well as the 2000 Planning Rule.

This report is approved:



ROB HARPER  
Forest Supervisor

10.9.07

Date

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## **EXECUTIVE SUMMARY**

### **FISCAL YEAR 2006 MONITORING & EVALUATION REPORT**

#### **Chippewa National Forest**

This is the second Monitoring and Evaluation Report compiled under the 2004 Chippewa National Forest Plan. The plan was signed by Regional Forester, Randy Moore, on July 30, 2004. Our Monitoring and Evaluation plan is described in Chapter IV of the Forest Plan. As explained in detail in Chapter IV, monitoring items consist of mandatory components you will find in every forest plan as well monitoring items that are tailored to address issues raised through public scoping and interdisciplinary team review.

After signing the Forest Plan, the Monitoring Implementation Guide was developed. The Monitoring Implementation Guide provides specific technical guidance that describes how, where, and when to accomplish the monitoring prescribed in the forest plan. It provides specific methods, protocols and analytical procedures. The Monitoring Implementation Guide establishes and schedules the priorities and should ensure efficient use of limited time, money and personnel. The guide is intended to be flexible and could be modified in response to new information, updated procedures or protocols, emerging issues, and budgetary considerations without amending the forest plan.

#### **Monitoring and Evaluation Report**

The information gained from the Monitoring and Evaluation Report is used to determine how well the desired conditions, goals, objectives, and outcomes of the forest plan have been met. However, at this point, two years after implementation of the revised Forest Plan, trends, patterns, and results generally are not clearly defined. Evaluations and conclusions that would lead to changes in the Forest Plan are not expected. Rather, this report focuses more on what we monitored, how it was monitored, how easy and efficient the protocols were to use, and how effective they were at answering the monitoring questions.

#### **Highlights from the Report**

- Timber target increased from 27,000 MBF in FY 2005 to 28,900 MBF (approximately 7%) in FY 2006.
- Given the current rate of thinning, clearcutting, and uneven-aged management, some shifts will need to be made in timber harvest planning and implementation treatments to meet the decadal Forest Plan objectives.
- The Wildlife, Fisheries and Rare Plant program is implementing projects at a level consistent with that proposed in the Forest Plan for aquatic and terrestrial habitat enhancement and restoration. Many of these projects are accomplished through partnerships. Sensitive plant habitat restoration projects have yet to occur.
- Additional funding may be needed to accomplish road decommissioning.
- Based on the Southeast Project on the Deer River Ranger District, costs to convert aspen or mixed aspen stands to paper birch or northern hardwoods are comparable to those in

the Forest Plan. However, costs to convert aspen or mixed aspen stands to spruce/fir are much higher than depicted in the Forest Plan. Continue to monitor and validate costs of implementation across the forest.

- Off-Highway Vehicle Road Travel Access planning was collaborative and ongoing throughout the year with completion and a decision anticipated late summer 2007.
- Site visits to heritage sites identified within timber sale projects, showed that avoidance and mitigation measures were effective and being followed as recommended in project designs. Non-project sites examined indicated no disturbance to archeological sites.
- From the Forest's perspective, interactions with the Leech Lake Band of Objibwe continue to strengthen and contribute towards sustaining and facilitating relationships, rights and American Indian well-being.
- Health and safety of the public and employees is ongoing. Results of annual water sampling efforts show the Forest is in compliance with potable water, swimming beaches, and waste water effluent standards and direction. Recreation facilities are maintained to meet cleanliness, safety and security standards. A communication plan for hazardous materials (HAZMAT) was developed. Additional adequate HAZMAT storage was provided.
- Harvested lands are adequately being restocked. Emphasis on evaluation of regeneration success in lowland conifers indicated high rates of regeneration. Because flooding or drought can result in substantial mortality after these young stands are considered stocked, Forest direction extended monitoring lowland conifer stands from 5 to 10 years.
- An evaluation of insect and disease trends did not indicate increases in populations that warranted management concern or actions. Although the population of jack pine budworm was expected to decline, this did not occur. Consequently, the effects of jack pine budworm should be monitored and considered during project planning.
- Monitoring done on blueberry plants (in the Sandplains area) is incomplete until prescribed fire is conducted. Based on data collected on the unburned plots, it appears that without fire, objectives for increased blueberry production may not be met. Monitoring should continue for at least two years after burning is complete. Monitoring of other sites on the forest is recommended to obtain a more representative sample and to obtain more reliable and conclusive results. In addition, the forest should assess the role of fire on the forest landscape by addressing the number and acres of fire treatments planned and number and acres implemented.
- A close look at vegetation composition and structure resulted in recommendations to continue to reduce aspen and increase white and jack pine, where appropriate. Opportunities for increasing the 0-9 age class should generally focus on regeneration harvesting from primarily of middle age classes (50-99 and 100-149), but this varies by landscape ecosystem.
- To maintain viable populations of species, continue to monitor Management Indicator Habitats (MIH), forest birds and their associations with MIH. Use trends and number to shape proposed management activities.
- With regard to non-native invasive species (NNIS), the extent of exotic earthworms and their effect particularly on the hardwood forest is unknown. Basic observation data is being collected. Management implications are uncertain. With time research will provide a better understanding of impacts and effects. Survey data on rusty crayfish,

another NNIS on the forest, is used to help inform the public of the spread of these invaders to other waterbodies and their threat to native species.

- Monitoring of the Woodtick Trail Wetland Restoration project, the first of its kind on the Forest which was completed in FY 2004, showed that the resulting community composition, vegetation, and effects on hydrology and soils are improving as desired. A look at lake water quality of several lakes across the forest indicates that conditions are not degrading.
- And finally, application and effectiveness of BMPs on several cutting units across the forest indicates that additional attention needs to be paid to consultation and documentation of changes from what was indicated in the EA or silvicultural prescription, additional coordination with forest personnel to capture opportunities to more efficiently and economically decommission roads, and the need for further training to assist timber sale layout crews in identifying seasonal ponds, particularly during winter. Findings also showed that activities were conducted within specified seasonal restrictions; there was little or no damage to residual trees; there was little or no evidence of rutting and soils were well protected; and there were ample dead and dying trees left on site.

### **Annual Activity Review**

Typically, the Forest Leadership Team spends a day reviewing several projects on one of the districts. A field day was planned but was cancelled due to high priority meetings with congressional delegates, timber industry representatives, and State and Federal agency personnel regarding the depressed timber prices, slump in the economy, and potential impact on Northern Minnesota.

### **Other Project Monitoring**

Monitoring of projects, large and small, occurs on all the districts and involves numerous resource professionals across the forest. Examples include sale administrators checking for compliance; field checking of timber marking to meet prescription objectives; conducting regeneration surveys to determine stocking levels, checking to determine if harvest units incorporate and reflect the silvicultural prescriptions and EA direction, checking application of mitigation measures to determine if they are appropriate and effective. Often times the monitoring is informal consisting of general field observations. Other times monitoring is more formal and entails following protocols; the results are generally included in the monitoring and evaluation reports.

### **Public Involvement**

We continue to publish the *Chippewa National Forest Quarterly*, a schedule of proposed actions and decisions that implement the Forest Plan. We encourage the public to become part of our management process by commenting on project proposals through the NEPA process. Information about planning our projects and project contacts can be found on the Internet at [www.fs.fed.us/r9/forests/chippewa/projects & plans](http://www.fs.fed.us/r9/forests/chippewa/projects&plans).

# MONITORING & EVALUATION REPORT

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## MONITORING & EVALUATION REPORT

### I. INTRODUCTION ---

This is the second Monitoring and Evaluation Report compiled under the 2004 Chippewa National Forest Plan. The plan was signed by Regional Forester, Randy Moore, on July 30, 2004. Our Monitoring and Evaluation plan is described in Chapter IV of the Forest Plan. As explained in more detail in Chapter IV, monitoring items consist of mandatory components you will find in every forest plan as well monitoring items that are tailored to address issues raised through public scoping and interdisciplinary team review.

The annual monitoring and evaluation report (M and E) provides an opportunity to track progress towards the implementation of revised forest plan decisions and the effectiveness of specific management practices. The focus of the evaluation is in providing short and long term guidance to ongoing management. The M and E report should include components such as:

- (1) Forest accomplishments toward desired conditions and outputs of goods and services.
- (2) Forest Plan Amendment Status.
- (3) Status of other agency/institution cooperative monitoring.
- (4) Summary of available information on MIS or comparable species.
- (5) Summary of large scale or significant projects or programs.
- (6) Update of research needs
- (7) Public participation/disclosure plan

Chapter II consists of monitoring for elements from the Monitoring Matrix of the Forest Plan tied to specific resource areas. Each of these includes some background information, a brief explanation of the monitoring activities and protocol used, and discussion on the evaluation or conclusions when feasible.

Chapter III provides a brief summary of on-going research and studies on the Forest.

Chapter IV addresses adjustments or corrections to the Forest Plan.

Chapter V is a list of the Forest Service employees that provided information contained in this report.

## II. DISCUSSION OF MONITORING

The following table consists of elements from the Monitoring Matrix, Table MON-4 of the Forest Plan. It identifies the resource element, the monitoring question, drivers, and frequency of measure that are discussed on the pages that follow in this report.

**Table 1: Resource areas, monitoring questions drivers, and measure frequency discussed in this report.**

Resource	Monitoring Question(s)	Driver (Applicable CFR's, FP Desired Conditions, and FP Objectives)	Measure Frequency
Social & Economic Stability	To what extent does output levels and location of timber harvest and mix of saw timber and pulpwood compare to those levels projected?	CFR 219.19.12(k)[1]. A quantitative estimate of performance comparing outputs and services with those projected by the forest plan;. 36CFR 219.7(f).A program of monitoring and evaluation shall be conducted that includes consideration of the effects of National Forest Management on land, resources, and communities adjacent to or near the National Forest being planned and the effects upon National Forest management from activities on nearby lands managed by other Federal or other government agencies or under the jurisdiction of local governments. D-TM-1, O-TM-1	Annual
All	How close are projected outputs and services to actual?	(36 CFR 219.12(k)[1]. A quantitative estimate of performance comparing outputs and services with those projected by the forest plan;	Annual
All	How close are projected costs with actual costs?	(36 CFR 219.12(k) [3]. Documentation of costs associated with carrying out the planned management prescriptions as compared with costs estimated in the forest plan.	Annual
Recreation	To what extent is the Forest providing a range of motorized and non-motorized recreation opportunities that incorporate diverse public interests yet achieve applicable MA and LE objectives.	D-REC-1, 7, 9, 10, 11, 12, 13. O-REC-1. D-RTL-1,3. O-RTL-1. D-RWA-1, O-RWA-1.	1-5 years
Recreation Motor Vehicles	To what extent is the Forest providing OHV opportunities; what are the effects of OHV's on the physical and social environment; and how effective are forest management practices in managing OHV use?	36 CFR 219.21[g]. Off-road vehicle use shall be planned and implemented to protect land and other resources, promote public safety, and minimize conflicts with other uses of the National Forest System lands. Forest planning shall evaluate the potential effects of vehicle	Annual

		use off roads and, on the basis of the requirements of 36 CFR 295 part of this chapter, classify areas and trails of National Forest System lands as to whether or not off-road vehicle use may be permitted. D-RMV-1, 2. O-RMV-1, 2.	
Transportation System	To what extent is the Forest, in coordination with other public road agencies, providing safe, cost effective, minimum necessary road systems for administrative and public use.	D-TS-1,2,3,4. O-TS-1,2,6,7,8.	1-5 years
Heritage Resources	1) Are avoidance or mitigation measures effective and being followed as recommended in project designs? 2) Are heritage resources being affected in non-project areas?	O-HR-1 and O-HR-2.	5 Years
Tribal Rights and Interests	Is Forest management helping to sustain American Indians' way of life, cultural integrity, social cohesion, and economic well being?	D-TR-1. O-TR-1. O-TR-3.	Throughout the year
Tribal Rights and Interests	Are government to government relationships functional?	D-TR-2. O-TR-2. O-TR-4.	Throughout the year
Tribal Rights and Interests	Is the Forest facilitating the right of the Tribes to hunt, fish, and gather as retained via treaty?	D-TR-3.	Throughout the year
Public Health and Hazardous Materials	Are Forest facilities and recreation sites safe for employee and public use and enjoyment?	O-PH-4.	5 Years
Public Health and Hazardous Materials	Does water in Forest provided drinking water sources and swimming beaches meet standards of quality protective of human health and aesthetics?	O-PH-1.	5 years
Public Health and Hazardous Materials	Does hazardous material storage on NF meet standards of quality protective of human health?	O-PH-2.	5 Years
Timber	Are harvested lands adequately restocked after five years?	(36 CFR 219.12(k)[5][i]. Lands are adequately restocked as specified in the forest plan	Annual

Insects & Disease	Are insects and diseases populations compatible with objectives for restoring or maintaining healthy forest conditions?	(36 CFR 219.12(k)[5][iv]. Destructive insects and disease organisms do not increase to potentially damaging levels following management activities. D-ID-3, O-ID-1, D-VG-5, D-VG-8, O-VG-11-13	Annual
Fire	How, where, and to what extent will prescribed fire be used to maintain desired fuel levels, and/or mimic natural processes, and/or maintain/ improve vegetation conditions, and/or restore natural processes and functions to ecosystems?	D-ID-4-5, O-ID-2-4	1-5 years
Vegetation	To what extent is the Forest providing a full range of vegetative communities that address diverse public interests and needs while contributing to ecosystem sustainability and biological diversity?	D-VG-1, -2,-3, -4	1-5 years
Vegetation Composition & Structure	To what extent is Forest management, natural disturbances, and subsequent recovery changing vegetation composition and structure? To what extent are conditions moving toward short-term (1-20 years) and long-term (100 years) objectives at Landscape Ecosystem, Management Area, and other appropriate landscape scales?	D-VG-1-6. O-VG-1-18	1-5 years
Wildlife	To what extent is Forest management providing ecological conditions to maintain viable populations of native and desired non-native species.	D-WL-3b, O-WL-1, O-WL-2. CFR 219.19 (6)	1-5 years
Wildlife: Management Indicator Species	What are the population trends of management indicator species?	36 CFR 219.19(a)(6). Population trends of the management indicator species will be monitored and relationships to habitat changes determined. This monitoring will be done in cooperation with state fish and wildlife agencies, to the extent practicable. O-WL-1, O-WL-15, O-WL-16, O-WL-32. O-WL-33.	Annual
Wildlife: Sensitive Species	To what extent is Forest management contributing to the conservation of sensitive species and moving toward short term (10-15 years) and long-term (100 years) objectives for their habitat conditions?	D-WL-1-9, O-WL-1-3. O-WL-17-32	1-5 years

Wildlife: Non-native Invasive Species	To what extent is Forest management contributing or responding to populations of terrestrial or aquatic non-native species that threaten native ecosystems?	D-WL-9. O-WL-38 & 39.	1-5 years
Watershed Health & Riparian-	To what extent is Forest management affecting water quality, quantity, flow timing and the physical features of aquatic, riparian, or wetland ecosystems?	All WS Desired Conditions and Objectives with the possible exception of D-WS-14, plus O-RWA-1 D-PH-3, D-PH-4, O-PH-3, O-TS-4 and O-TS-5	1-5 years
Soils	Are the effects of Forest management, including prescriptions, resulting in significant changes to productivity of the land?	36 CFR 219.12 (k) [2], Documentation of the measured prescriptions and effects, including significant changes in productivity of the land; D-WS-3, D-WS-12, O-WS-9, O-WS-10	1-5 years
All	Monitoring and evaluation requirements will provide a basis for a periodic determination of the effects of management practices. 36 CFR 219.11(d) At intervals established in the plan, implementation shall be evaluated on a sample basis to determine how well objectives have been met and how closely management standards and guidelines have been applied. Based upon this evaluation, the interdisciplinary team shall recommend to the Forest Supervisor such changes in management direction, revision, or amendments to the forest plan as are deemed necessary. (36 CFR 219.12(k))	Monitoring Regulatory Requirement, Table MON-1, Forest Plan, p 4-3.	

## 1. Social & Economic Stability

### Monitoring Question:

To what extent does output levels and location of timber harvest and mix of sawtimber and pulpwood compare to those levels projects?

### Monitoring Driver:

D-TM-1 The amount of commercial timber sales available for purchaser is at a level that is sustainable over time. Mill operation in northern Minnesota can depend on a consistent level of timber harvest on the National Forest.

O-TM-1 Provide commercial wood for mills in northern Minnesota. Harvested material supplies sawmills, veneer mills, paper mills and mills constructing engineered wood products (hardboard, particleboard, oriented strandboard, etc.). The Forest provides posts, poles and logs for log home construction.

### Background:

This information was compiled from actual sales that were offered during Fiscal Year (FY) 2006 and is a reflection of the forest's ability to satisfy local demand for wood products.

**Monitoring Activities:** Types of information monitored include the amount of volume offered, amount of volume harvested, amount of uncut volume under contract, and the number of acres offered. The volume offered is further broken down into sawtimber and pulpwood. The amount of volume offered is negotiated with the regional office each year and is more a reflection of the budget than the capability of the land. Information provided below is from the FY 2006 Annual Bid Monitoring Report and the Timber Cut and Sold Report (Timber Sale Statements of Account (TSA)).

### Evaluation and Conclusions:

**Table 2.** Timber Target, Volume Offered & Sold, Volume Harvested, and Uncut Volume under contract, and acres offered by FY.

	FY 2005	FY 2006
Timber Target	27,000 MBF	28,900 MBF
Volume Offered & sold <sup>1</sup>	27,184 MBF	28,929 MBF
Volume Harvested	26.8 MMBF	20.6 MMBF
Uncut volume under contract	43.2 MMBF	53.1 MMBF
Acres offered	3868	3525

<sup>1</sup> FY 2005 target was for volume offered; FY 2006 target was for volume sold.

FY 2006 was the second full reporting year under the 2004 Revised Forest Plan. In FY 2006 the assigned forest target was based on the volume offered to the public and sold. This is a slight change from FY 2005 where target credit was based on sales offered regardless whether they were sold. The target assigned in FY 2006 increased from 27,000 MBF in FY 2005 to 28,900 MBF (approximately 7%). The actual volume offered and sold in FY 2006 increased from 27,184 MBF in FY 2005 to 28,929 MBF (approximately 6%). Uncut volume under contract

increased in FY 2006 for a second year in a row. Correspondingly, volume harvested levels decreased in FY 2006 from the amount harvested in FY 2005. This can be explained in that several oriented strandboard manufacturers temporarily ceased production during August and September due to market conditions for their product. This, coupled with an unusually warm first half of the winter which limited harvests on sites requiring frozen ground conditions, led to the decrease in amount harvested and the increase of volume under contract.

Increasing efficiency and reducing timber unit costs has been a top emphasis item for the Forest for the last few years. This effort leveled out in FY 2006 with the Forest still emphasizing efficiency in process and delivery. In comparison with FY 2005, timber unit costs decreased slightly by approximately 2%.

Competition for the Chippewa National Forest timber volume was strong although there was a decrease in the number of bidders by approximately 25%. There were 21 bidders during FY 2006 compared to 28 in FY 2005. On average, there were 1.9 bidders per sale, which compared to 4.4 bidders last fiscal year. The number of bidders per sale ranged from zero to eight. There were six single bid sales. There were two no bid sales at the end of the year and because of market conditions the Forest chose to reoffer those sales the first quarter of FY 2007. This decrease in total number of bidders may have been due to the increase in advertised prices throughout the year and mill shutdowns near the end of the year.

**Table 3.** Ratio of sawtimber to pulpwood volume sold

	Decade 1 (Proposed)	Actual Ratio FY 2005	Actual Ratio FY 2006
Sawtimber:Pulpwood	32:68	15:85	18:82

As shown above, the ratio of sawtimber to pulpwood is quite a bit lower than what was predicted in the Plan. This is due to more thinning in smaller diameter conifer stands than was anticipated.

In FY 2006, sawtimber prices of most species increased more rapidly than pulpwood prices. The average bid price for sawtimber increased by 42%. Pulpwood prices had increased dramatically during FY 2005. In 2006, the average price for pulpwood remained relatively steady with a 2% increase as compared to FY 2005. This resulted in an 8% increase in average bid prices for all species/products combined to \$108.42 per MBF.

A comparison of the actual revenues generated to the estimated revenues from timber harvest is displayed in the table below. The estimated revenues are taken from Forest Plan Revision, Volume II Appendices, Table BEIS-7, pg B-11.

**Table 4.** Actual verses Estimated Revenues from Timber Production in FY 2006

Species	Product	1996-1998 Avg. Price/MBF Expected Revenue	FY 2006 Avg. Price/MBF	Percent Difference
Aspen	Pulpwood	59.30	126.42	53
Mixed Hardwood	Pulpwood	28.13	59.33	53
Mixed Hardwood	Sawtimber	54.12	72.66	26
Balsam Fir	Pulpwood	61.96	94.05	34

Spruce	Pulpwood	64.38	89.47	28
Spruce	Sawtimber	75.41	117.14	36
Pine	Pulpwood	28.50	87.90	68
Jack Pine	Sawtimber	127.13	142.91	11
Red/White Pine	Sawtimber	238.63	143.39	(69)

Overall revenues in FY 2006 were significantly higher than those estimated in the FEIS analysis. The exceptions are jack and red/white pine sawtimber. Pine harvested in FY 2006 was mainly smaller diameter pine from thinning operations rather than higher valued sawtimber.

The bid ratio (advertised value/bid value) for FY 2006 remained at 61%. The reason for the large increase in average combined selling values and low bid ratio was an increase in bid rates for hardwood and jack pine sawtimber.

The Chippewa National Forest harvested timber on a total of 2,572 acres in FY 2006. Table 5 compares the acres harvested by treatment method to the acres Proposed for Decade 1 (Table APP-D2: Forest Plan, D-3, Estimate of Acres of timber harvest by treatment method (Forest Wide)).

**Table 5.** Comparison of acres by treatment method to that Proposed for Decade 1

Treatment Method	Decade 1 (Proposed)		Actual Accompl (FY 2005)		Actual Accompl (FY 2006)		Total (FY 2005-2006)	
	Acres	Percent	Acres	Percent	Acres	Percent	Acres	Percent
Thinning	6749	9	2172	54	1371	53	3543	54
Clearcutting	29886	39	949	24	782	31	1731	26
Shelterwood/ Partial Cut 30	11149	14	489	12	295	11	784	12
Uneven-aged (all types)	29375	38	387	10	124	5	511	8
Totals	77139	100	3997	100	2572	100	6569	100

The Decade 1 harvest treatment numbers projected in the Forest Plan are decadal projections not annual projections and are based on full funding and implementation of the Plan. Mixes of potential harvest treatments is a tool to accomplish Forest Plan objectives but are not an objective in and of themselves. Harvest treatment acres in any fiscal year are a reflection of the relatively few environmental decisions being implemented during that year. Each environmental analysis (EA) and the set of harvest treatments resulting from that decision are based on meeting the vegetation objectives for the Landscape Ecosystem (LE) in which the project is being implemented. Vegetation objectives and existing conditions vary by LE, so some peaks and valleys are expected in annual harvest treatment types, but over the decade meeting the vegetation objectives across a mix of project areas should yield harvest treatments similar to those projected in the Plan. Comparing the percentages on an annual basis will be useful as harvest treatments are tracked over time.

Based on current percentages, thinning acres are over accomplished. There are several reasons for this. This is in part a reflection of a large thinning project that was implemented in the first two years of Forest Plan implementation. In addition, our highest priority LEs for treatment

tend to be the Dry Mesic Pine and Dry Mesic Pine-Oak LEs. These are the LEs that are most out of sync ecologically and have the highest fire hazards. Red pine is a significant component on these LEs and has been a focus for treatment. In addition, there is a large amount of red pine that has recently become the age and size that would benefit from commercial thinning.

Clearcutting is lower than Forest Plan projections. During Forest Plan revision it was recognized that there would be less regeneration in the initial years of Forest Plan implementation as the youngest vegetation age classes are over-represented in most LEs.

The actual percentage of shelterwood and partial harvest is comparable to that proposed in the Plan and are not a concern at this time.

Uneven-aged harvest prescriptions are less than projected thus far. More emphasis has been placed on uneven-aged treatments in hardwood and some conifer stands in recent planning projects.

It is recognized that some shifts will need to be made in planning and implementation to meet the decadal Forest Plan objectives at the current rate.

#### **Payments to Counties:**

The federal government makes payments to states to cover some of the cost of local government services on tax-exempt National Forest System lands. The states pass those payments on to the counties in which national forests are located. Payments in Lieu of Taxes (PILT) payments are calculated and made by the Department of Interior, Bureau of Land Management. These payments are appropriated annually by Congress based on available funding and formulas that take into account the population in the affected counties, the number of acres of federal land in those counties, and other payments received by the counties based on federal land payments.

Payments are also made to states amounting to 25 percent of gross receipts from activities on national forests, such as timber sales, mining, special uses and recreation. Congress passed the Secure Rural Schools and Community Self-Determination Act (SRS) in 2000, which allowed counties to choose a level payment based on the high-three year average of 25 percent payments, or to continue to receive 25 percent of the current year's receipts. On the Chippewa National Forest, Itasca County and Cass County opted for the level payment. Beltrami continued with the payment based on current annual receipts.

The SRS expired in 2006, but Congress extended it through 2007. If it is not extended or reauthorized, the Forest Service will make the 25 percent payments to all counties based on current year receipts. The following table shows the breakdown of the 2005 and 2006 payments to Beltrami, Cass and Itasca counties.

**Table 6.** Payments to Counties.

FY 05		25% FUND		Payment in Lieu of Taxes		Grand total	
County	Acres	Total \$	Per Acre	Total \$	Per Acre	Total \$	Per Acre
BELTRAMI	64,722	\$55,882	\$0.863	\$60,542	\$0.94	\$116,424	\$1.80
CASS	290,696	\$544,750	\$1.874	\$197,531	\$0.68	\$742,281	\$2.55
ITASCA	311,123	\$582,873	\$1.873	\$215,413	\$0.69	\$798,286	\$2.57
<b>TOTAL</b>	<b>666,541</b>	<b>\$1,183,505</b>	<b>\$1.776</b>	<b>\$473,486</b>	<b>\$0.71</b>	<b>\$1,656,991</b>	<b>\$2.49</b>

FY 06		25% FUND		Payment in Lieu of Taxes		Grand total	
County	Acres	Total \$	Per Acre	Total \$	Per Acre	Total \$	Per Acre
BELTRAMI	64,722	\$53,622	\$0.828	\$70,259	\$1.09	\$123,881	\$1.91
CASS	290,696	\$550,198	\$1.893	\$204,086	\$0.70	\$754,284	\$2.59
ITASCA	311,202	\$588,702	\$1.892	\$222,495	\$0.71	\$811,197	\$2.61
<b>TOTAL</b>	<b>666,620</b>	<b>\$1,192,522</b>	<b>\$1.789</b>	<b>\$496,840</b>	<b>\$0.75</b>	<b>\$1,689,362</b>	<b>\$2.53</b>

## 2. All-Outputs

### Monitoring Requirement:

How close are projected outputs and services to actual?

### Monitoring Drivers:

A quantitative estimate of performance comparing outputs and services with those projected by the forest plan; (36 CFR 219.12(k)).

### Background:

Information in this section is specific to the estimated amount of an activity or Practice listed on Table APP-D4 in the Forest Plan, Appendix D. Proposed and Probable Practices, Goods Produced, and Other Information.

Table APP-D4 lists forest management activities, other than timber harvest, that are proposed to work toward the desired conditions and objectives during the first 10 years of Plan implementation. The Social and Economic Stability section presents and discusses information tied to timber harvest.

**Table 7.** Proposed Practices and accomplished by FY.

Table APP-D4: Proposed Practices (Forest-wide)			Accomplished*	
Activity or Practice	Unit of Measure	Estimated Amount for decade 1	FY 2005	FY 2006
Stream Channel Reconstruction	miles	5 to 30	5 miles of stream restored or enhanced	5 miles of stream restored or enhanced

				0.1 mile of reconstruction
Sensitive Plant Habitat Restoration	projects	20	0	0
Wildlife Habitat Restoration	projects	80	1254 acres terrestrial 133 structural improvements 399 acres aquatic 8 projects (terrestrial)	754 acres terrestrial 66 structural improvements 120 acres aquatic
New ATV trail designated (maximum amount listed)	miles	90	0	0
New Snowmobile trail designated (maximum amount listed)	miles	100	0	0
New Water Access Sites (maximum amount listed)	sites	5	0	0
Roads Constructed (only OML –1 roads being constructed)	miles	19	0	0
Roads decommissioned (system)	miles	200	13.2 (28.9 in FY 2004)	14.76 2.52 miles unauthorized roads

\*Accomplishments include projects completed using Forest service and partnership funds combined

Discussed below are areas of accomplishment pertinent to stream channel reconstruction, wildlife habitat restoration, and road decommissioning.

In FY 2006, the Chippewa's Wildlife, Fish, and Rare Plants staff accomplished 31 projects totaling over \$441,000. Of these 31 projects, 16 were accomplished with partners, who include natural resource professionals from Tribal and governmental agencies, lake and watershed associations, local schools and universities, and civic organizations. In FY 2006, the Forest benefited from the work of at least 21 partners who contributed over \$79,000 in goods and services for wildlife, fish, and naturewatch (interpretative) projects. Together we accomplished:

- 754 acres of terrestrial habitat improvements and 66 structural (wildlife) improvements
- 120 acres of lake habitat improvements & 5 miles of stream habitat improvements
- 5 miles of habitat inventory in streams and 23 acres of habitat inventory in lakes
- 2640 acres of Threatened, Endangered & Sensitive species habitat inventory (terrestrial & aquatic)
- 5 monitoring plans
- 1 administrative study, and
- 185 naturewatch presentations on wildlife, fish, and rare plants

A more detailed description of these projects and the Wildlife, Fish and Rare Plants program on the Forest can be found at:

[Chippewa National Forest - Publications](#)

Accomplishment data are stored in the Wildlife, Fish and Rare Plant Management System on line database at: [WFRP Management System Home - Watershed, Fish, Wildlife, Air & Rare Plants - USDA Forest Service](#)

Road decommissioning is defined as activities that result in the stabilization and restoration of unneeded roads to a more natural state. In order to meet the decadal objective of decommissioning 200 miles of road, the Forest would need to average approximately 20 miles of decommissioning per year. In FY 2006 14.76 miles of system road was decommissioned and another 2.52 miles of unauthorized (non-system) road. A total of 56.9 miles of system roads have been decommissioned since the inception of the Forest Plan. The decommissioning was completed through a mixture of tree plantings, placing rock berms at the entrances, and also through natural revegetation.

**Evaluation and Conclusions:**

The Wildlife, Fisheries and Rare Plants program on the Chippewa National Forest is implementing projects at a level consistent with that proposed in the Forest Plan for aquatic and terrestrial habitats enhancement and restoration. Sensitive plant habitat restoration projects have yet to occur. The program effectively leverages partnership funds to achieve program objectives, conduct surveys and inventories and outreach the public through educational programs.

There have been 10 signed project decisions during FY 2004-2006 that have identified 143 miles of system roads and 3.75 miles of unauthorized roads for decommissioning.

Monitoring of recently decommissioned roads to ensure they remain effectively closed and are returning to a more natural state occurred and was reported in the FY 2005 Monitoring and Evaluation Report. Further monitoring is currently scheduled for FYs 2007 and 2008.

**Recommendations:**

The program should continue active partnership outreach and look for opportunities to restore sensitive plant habitats where necessary.

Additional funding for road decommissioning is needed. Funding in other resource areas such as that for Watershed Restoration, Wildlife Habitat and Threatened, Endangered and Sensitive species protection should be directed toward road decommissioning when removal or closure of system or unauthorized roads meets objectives for those resources. As additional decommissioning needs are identified, a Forest Plan amendment may be necessary.

Upon completion of OHV Road Travel Access Project Environmental Assessment (refer to Recreation and Recreation Motor Vehicles section for more details), begin a planning process to provide up to an additional 90 miles of designated OHV trail.

### 3. All-Costs

**Monitoring Requirement:**

How close are projected costs with actual costs?

**Monitoring Drivers:**

Documentation of costs associated with carrying out the planned management prescriptions as compared with costs estimated in the forest plan (36 CFR 219.12(k) [3]).

**Background:**

Costs used in the analysis of the Forest Plan alternatives are displayed in FEIS, Appendix B, pages B-8 through B-10. These pages contain the activities and associated costs that were combined to harvest and/or establish trees to meet the landscape ecosystem objectives for the 2004 Revised Forest Plan analysis. Tables consist of costs per acre for each forest management activity; the sequence of activities and total costs associated with harvesting and regenerating a particular forest type to the same forest type; and the sequence of activities and total costs associated with harvesting, regenerating, and converting a particular forest type to another forest type.

For the purposes of this exercise, the types of regeneration harvest activities being prescribed for forest types in the Southeast Project were compared to the activities and costs used for Forest Plan analysis. Planning for the Southeast Project was completed in FY 2006. The Southeast Project did not include treatments for all forest types; consequently, only those found in the project are included in this analysis. The Southeast Project included harvest treatments to regenerate an existing forest type to the same forest type and to regenerate an existing forest type to a different forest type (conversion).

Activities and costs for prescriptions have not been previously monitored. Yet if the forest is expected to fully implement the Forest Plan, then implementation costs should be in concert with those used during the planning process or significant cost saving should be incurred in some step along the way. The M and E Report for FY 2005 had a brief discussion on actual versus planned costs for burning site preparation, single release, animal browse protection, pruning and planting but did not look at all the treatment activities being prescribed and the associated costs on a stand by stand basis.

**Monitoring Activities:**

The following table displays the forest management activities for the selected alternative in the Southeast Project and associated costs for each of those activities. The costs shown in the second column are from the FP FEIS, Appendix B (Table BEIS-2, pg B-8) and are in 1998 dollar values. Costs shown in the third column are associated with timber regeneration harvests from the Southeast Project and were used during project planning for the economic analysis (June 2006). Costs for the Southeast Project were based on input from the fuels management specialist, district silviculturist, and the CNF KV supplement to the Forest Service Handbook. In most instances, costs are higher than FP 1998 costs; this appears to be true for projects elsewhere

on the forest. Exceptions occur for sale preparation and administration where costs have decreased on some districts due to efficiencies and expertise gained by field personnel in marking more complex prescriptions.

**Table 8.** Forest Management Activities and Costs

Activity	FP Costs per acre 1998	Southeast Project Unit Costs per Acre 2006
Sale Preparation and Administration: clearcutting	\$119	\$110
Sale Preparation and Administration: thinning, shelterwood, partial cutting,	152	220
Stocking survey	6	7 – planted 3-- natural
Site Preparation – combined mechanical and prescribed fire	115	220 mechanical
Site Preparation – prescribed fire	143	600 (if less than 100 acres)
Planting	218	400
Inter-planting	119	400
Seeding	36	110
Release (normal is 2.5 releases)	332	500
One Release	133	200
Browse protection for planted white pine	133	75

### Evaluation and Conclusions:

In the first step of the analysis, activities planned for stands in Southeast Project were compared to the activities in prescriptions for implementation to ensure they were consistent. For most stands, planned activities as shown in the EA (Table B-2, Southeast EA) matched those in the prescriptions. In the few cases where there were differences, the rationale for the changes had been documented in the prescription.

Total costs in the tables below include sale layout, marking, cruising and sale administration and the cost of one stocking survey.

#### *Activities and costs to regenerate an existing forest type to the same forest type:*

The following table displays the regeneration activities and costs for establishing existing forest types, e.g. spruce/fir is regenerated to spruce/fir, as displayed in the Forest Plan FEIS compared to those for the Southeast Project. Columns two and three are the treatments and costs for the forest types displayed in the 2004 FP FEIS (pg B-9). Columns four and five display the treatments and costs by forest type for the Southeast EA.

**Table 9.** Establishing an Existing Forest Type—treatments and associated costs.

Forest Plan			Southeast Project Treatment Prescriptions	
Forest Type	Activities	Total Cost 1998	Activities	Total Cost 2006
<b>spruce/fir</b>	cc; site prep; plant; release	790	cc; seed	223
	pc; site prep; nat regen	273	sh; nat regen; release	613
<b>aspen &amp; aspen- spruce/fir</b>	cc; nat regen	125	cc; nat regen	113
			cc; seed	223
			cc; nat regen; release	613
	pc; nat regen	158	pc; mech site prep; release	943
			sw; nat regen; release	613
<b>paper birch</b>	cc; nat regen	125	cc; nat regen; release	613
	pc; site prep; nat regen	273	pc; nat regen; release	613
<b>northern hardwood</b>	pc; nat regen	158	pc; nat regen	223

Site prep(aration): preparing an forest area for regeneration

Nat(ural) regen(eration): seedlings have not been planted by people

Release: removal of unwanted vegetation to promote growth of targeted species

cc- clearcut

pc- partial cut

sh- shelterwood

In general:

- The FP FEIS presents the two most common treatment scenarios with associated costs for a forest type. Site specific prescriptions reflect a wider array of treatments for each forest type and a wider range of costs. For example, the Forest Plan indicates that for the aspen & aspen-spruce/fir forest type, clearcutting or partial cutting, each with natural regeneration would occur. The Southeast project specified a broader range of treatments for the SE project, some of which included site preparation and release that increased the costs substantially.
- A seeding rather than planting is planned which is cheaper than planting but success at this time is undetermined.
- Release as specified in the Southeast project prescriptions reads “release, as needed, until free to grow”. The assumption made for the FEIS and reflected in the costs for Southeast Project in the above table, is that release, on the average, will be done 2.5 times to meet desired conditions, silvicultural and stocking objectives, although in reality it may occur only once in some stands and three or more times in other stands. For the aspen and birch forest types, the prescriptions include release whereas the FEIS did not identify this as an activity for those forest types.
- In the majority of aspen & aspen/spruce stands in the Southeast project (75%), proposed treatments consist of clearcutting and natural regeneration. The remaining 25% of the stands incorporate other treatments such as site preparation and release needed to meet objectives which increases costs substantially.
- In the Southeast Project it is anticipated that harvest activity during the summer and fall

will result in enough ground scarification that mechanical or burning site preparation is not needed on many sites.

- Many of the northern hardwoods stands have advanced hardwood regeneration in the understory that can be released with the harvest. FEIS and project activities for the northern hardwood type were the same.

*Activities and costs to regenerate an existing forest type to a different forest type (conversion):*

The following table compares activities and costs from the FEIS (Table BEIS-4, pg B-10) to the Southeast Project when establishing a different forest type (conversion). These activities and costs are tied to regeneration harvests. Columns two and three display activities from the Forest Plan; columns four and five display information from the Southeast Project.

**Table10. Establishing a Different Forest Type-- Activities and Costs**

Forest type established	Forest Plan		Southeast Project Treatment Prescriptions	
	Activities	Total Cost 1998	Activities	Total Cost 2006
<b>spruce/fir</b>	cc; site prep; plant; release	790	cc; site prep; plant; release	1236
			cc; burn; plant; release	1616
			cc; plant; release	1016
	sh&pc; site prep; plant, release	823	pc; mech site prep; plant; release	1346
			sh; animal control (5 yrs)	488
<b>paper birch</b>	cc; site prep; plant; release	790	cc; mech site prep; release	836
	pc; site prep; plant; release	823	pc; release	613
<b>northern hardwoods</b>	cc; one release(requires nh present-assume by LE)	258		
	pc; one release(requires nh present-assume by LE)	291	pc;	113
			Pc; mech site prep; plant	846

Site prep(aration): preparing an forest area for regeneration

Nat(ural) regen(eration): seedlings have not been planted by people

Release: removal of unwanted vegetation to promote growth of targeted species

cc- clearcut

pc- partial cut

sh- shelterwood

Some general comments:

- Southeast Project identified numerous aspen stands to be converted to other forest types, primarily spruce/fir or hardwoods. Because of the high costs associated with conversion, the district reduced the number of stands to those that could be converted most efficiently and economically.
- The most economical stands to convert were those with an existing hardwood component in the understory that could be released through harvesting; that is, a partial cut coupled

with a release of existing regeneration. Roughly 50% of the stands converted fell into that category.

- The remaining 50% of the stands incorporated a variety treatments, most frequently some type of site preparation followed by planting. Release was considered necessary in all stands to convert stands to spruce and fir.
- Release as specified in the Southeast prescriptions reads “release, as needed, until free to grow”. The assumption made in the FEIS and reflected in the treatment costs above, is that release, on the average, will be done 2.5 times to meet desired conditions, silvicultural, and stocking objectives, although in reality it may occur only once in some stands and three or more times in other stands. The need for release was recognized in the FEIS.
- The Forest Plan generally identifies two pathways for conversion for each forest type; whereas project plans identify several other treatment scenarios to meet the conversion and management objectives.
- Costs to convert aspen or mixed aspen stands to paper birch or northern hardwoods are comparable to those in the Forest Plan, although the treatment scenario differs somewhat.
- Costs to convert aspen or mixed aspen stands to spruce/fir are much higher than depicted in the Forest Plan. The difference can be attributed to higher project costs for planting and release.

**Recommendations:**

On many sites, to meet the desired conditions and diversity objectives in the 2004 Forest Plan, more complex prescriptions for establishing existing or different forest types often are needed. If costs are consistently higher than those used in the Forest Plan, an adjustment or amendment to the Forest Plan may be warranted. Continue to monitor and validate costs for projects across the forest.

#### ***4. Recreation and Recreation Motor Vehicles (OHV)***

**Recreation Monitoring Question:**

To what extent is the Forest providing a range of motorized and non-motorized recreation opportunities that incorporate diverse public interests yet achieve applicable Management Areas and Landscape Ecosystem objectives?

**Monitoring Driver – Desired Condition and Objectives:**

36 CFR 219.21[g]. Off-road vehicle use shall be planned and implemented to protect land and other resources, promote public safety, and minimize conflicts with other uses of the NF system lands. Forest planning shall evaluate the potential effects of vehicle use off roads and on the basis of the requirements of 36 CFR 295 part of this chapter, classify areas and trails of NF system lands as to whether or not off-road vehicle use may be permitted.

D-REC-1 The Forest provides a range of quality motorized and non-motorized recreation

opportunities to satisfy diverse public interests while maintaining sustainable ecosystems

D-REC-7 Recreation activities continue to occur with little or no disruption when forest management activities are near or adjacent to public use areas and facilities.

D-REC-9 Foot travel throughout the Forest is welcome for the wide spectrum of recreation activities and opportunities such as hunting, orienteering, hiking, and bird watching as well as spiritual and cultural pursuits.

D-REC-10 In conjunction with State regulations, the Forest provides a range of quality hunting, trapping, and fishing opportunities.

D-REC-11 In cooperation with other agencies and groups, the Forests enhance existing and provide additional wildlife viewing opportunities.

D-REC-12 The Forest provides developed recreation sites, such as campgrounds and picnic areas, that accommodate the needs of a wide variety of visitors. Easy to access, safe, comfortable, and convenient facilities are provided in scenic environments. Most developed sites accommodate concentrated public use.

D-REC-13 The Forest provides dispersed recreation facilities such as campsites and picnic sites for small groups. Dispersed recreation opportunities emphasize a remote recreation experience, have few or no facilities, and are often near bodies of water or along roads and trails where public use is low.

O-REC-1 Improve the capability of the Forest to provide diverse high quality outdoor recreation opportunities.

D-RTL-1 The Forest trail system provides a range of activities and experiences necessary to accommodate recreation uses while minimizing environmental and social impacts.

D-RTL-3 The Forest provides non-motorized trail opportunities in a variety of forest settings.

O-RTL-1 Proposed non-motorized trails that meet user demand and other forest management direction will generally be considered.

D-RWA-1 The Forest provides a range of water access sites with related recreation

opportunities on lakes and river segments. Levels of facility development are appropriate to the lake and river classifications and ROS class objectives. Some lakes and river segments do not have any developed water access sites.

O-RWA-1 Associated recreational, subsistence, and commercial water uses at water access sites will enhance or maintain water quality, TES species, and viable populations of native species and desirable non-native species.

**Recreation Motor Vehicles Monitoring Question:**

To what extent is the Forest providing OHV opportunities, what are the effects of OHVs on the physical and social environment; and how effective are forest management practices in managing OHV use?

**Monitoring Driver – CNF Forest Plan Desired Condition and Objectives:**

36 CFR 219.21[g]. Off-road vehicle use shall be planned and implemented to protect land and other resources, promote public safety, and minimize conflicts with other uses of the NF system lands. Forest planning shall evaluate the potential effects of vehicle use off roads and on the basis of the requirements of 36 CFR 295 part of this chapter, classify areas and trails of NF system lands as to whether or not off-road vehicle use may be permitted.

D-RMV-1 The forest provides OHV road and trail riding opportunities with experiences in a variety of forest environments, while protecting natural resources.

D-RMV-2 Allowed, restricted, and prohibited OHV uses are clearly defined to the public. Where practical, OHV policies are consistent with adjacent public land management agencies.

O-RMV-1 The Forest will determine which existing OML 1 and OML 2 roads are appropriate or inappropriate for OHV use.

O-RMV-2 A maximum of 90 additional ATV trail miles and 100 snowmobile trail miles with associated trail facilities (trailhead parking, signs, toilets, etc.) may be added to the designated NF trail system.

**Background :**

The outcome of monitoring is potential change in management within the context of the Forest Plan. Information gathered during this year's monitoring process has not been gathered in prior years under the 1986 Forest Plan. Initial information establishes the baseline for the next decade.

The information on recreation and recreation motor vehicles (OHV) is presented together because there is so much overlap between the two elements. Current condition includes both motorized and non-motorized recreational opportunities on the CNF, and is reflected by trails, roads, water access and management areas.

There are 692 total trail miles on the CNF. Designated motorized trails include 315 miles of snowmobile and ATV trails. Current condition includes approximately 20 miles of designated ATV trail on the Soo Line Trail. There have been no new motorized trails constructed or decommissioned during FY 2006.

Non-motorized designated trails include 300 miles of hiking, hunter-walking, horse, and cross-country skiing trails. There have been no new non-motorized trails constructed or decommissioned during FY 2006.

There are 2,549 miles of FS roads on the Chippewa, and currently there are 1,530 miles open to OHV use. Roads open to OHV use are Objective Maintenance Level (OML) 2, unless they are posted closed to motorized use. OML 2 roads are the low standard developed system roads that provide access throughout the general forest area and are maintained to be accessible by high clearance vehicles.

There are over 700 lakes on the CNF and 65% of them have water access points. Approximately 70% of these water access sites (244 sites) are user developed while the rest (107 sites) are agency designated and managed sites. The 45% remaining lakes with no known access points are generally very small natural environment lakes or are in designated Semi-primitive Non-motorized Management.

The management areas reflected in the 2004 Forest Plan include expectations for motorized/non-motorized access. The Forest Plan allocates approximately three percent of the CNF as a Semi-primitive non-motorized area; and less than two percent of land is recommended to have no motorized access within the Unique Areas, Research and Candidate Research Natural Areas. Approximately 96% of the CNF allows for motorized vehicle opportunities.

**Table 11:** Summary -Range of Motorized and Non-motorized Activities

Opportunity	FY 2005	FY 2006
<b>Snowmobile Trails</b>	378 miles	378 miles
<b>ATV Trail</b>	20 miles	20 miles
<b>Non-motorized</b>	342 miles	342 miles
<b>Road Miles open to OHV Use: Due to administrative changes</b>	2,103 miles	1,530 miles
<b>Additional developed lake boating access sites</b>	0 additional sites	0 additional sites

<b>CNF non- motorized ROS Classes (% acres)</b>	4%	4%
<b>CNF motorized use ROS classes (% land)</b>	96%	96%

The Travel Management Final Rule (2006) provides expectations for OHV travel access management on the National Forests. The intent of the Rule is to provide regulation of OHVs as a result of the tremendous increases in the number and power of OHVs; widespread environmental and social impacts from unmanaged recreation; while recognizing that motorized recreation is a legitimate use of National Forest system lands in the right places. Following is a summary of those requirements:

- The Rule requires each national forest and grassland to designate those roads, trails, and areas that are open to motor vehicle use by class of vehicle and if appropriate, time of year. Field units may provide for limited cross-country travel for big game retrieval or dispersed camping if appropriate, to respond to local situations. This authority will be used sparingly.
- Objective Maintenance Level (OML) 1 roads are closed to highway legal vehicles, but are still needed for long-term access. In special cases, an OML1 road may be designated as a trail and displayed as a trail on a motor vehicle use map.
- OML 2 roads are maintained for high clearance vehicles and would generally be open to OHV use.
- OML 3, 4, and 5 roads are open and maintained for travel by passenger cars and will generally not be open for OHV use. However, there may be some roads available upon recommendation of a mixed-use analysis that incorporates user safety considerations.

There are two law enforcement officers and 21 forest protection officers on the CNF. Enforcement of forest orders and other appropriate 36 CFR regulations occurs as needed on the Forest. For many years, including FY 2006, there has also been a Cooperative Law Enforcement agreement with Cass and Itasca Counties that provides for a county deputy to work four days a week during the summer while concentrating on National Forest land.

### **Monitoring Activities:**

#### *Collaborative Team 2004 Forest Plan and Travel Rule Implementation Process in 2005/2006:*

The CNF is actively working to implement the Forest Plan and Travel Management Rule. To effectively and cohesively meet the needs of forest visitors, we are collaborating with the MN DNR; Cass, Itasca and Beltrami Counties; Leech Lake Band of Ojibwe; and associated Townships in an interdisciplinary team of recreation, law enforcement, wildlife, and vegetation

managers; FS, DNR and County leadership, elected government officials; and lay people as sponsored by counties.

From the collaborative effort, there has been a Planning and Process OHV Team convened to strategically plan the OHV analysis process. Subsequently there has been working groups assembled to address OHV related issues needing recommendations. These include the Chippewa's Off-Highway Vehicle Road Travel Access Project Environmental Assessment Team; Sign Team; Law Enforcement and Education Team; and Mapping Team. Team tasks include recommending roads as open or closed to OHV access; OHV trail opportunities; OHV informational and regulatory signing; law enforcement, visitor education; and mapping of riding opportunities.

There have been eight community public informational meetings to involve and inform people in the OHV planning process. Workshop meeting goals included finding out what is important to people about specific road/trail OHV opportunities within the Forest along with other concerns people may have regarding OHV use. These public meetings were jointly hosted by the FS, MN DNR, Cass, Beltrami and Itasca Counties to emphasize the shared and overlapping opportunities the public land management agencies provide for legal OHV riding opportunities.



**Figure 1:** Community OHV Informational Meeting

### **Law Enforcement:**

Law enforcement personnel, including Forest Service, State, Counties, Local and Tribal officers, monitor and respond to OHV activities and associated behavior on the National Forest and adjoining lands.



**Figure 2:** Illegal Cross-Country ATV Use

Offenses are combined for reporting purposes into categories. OHV offenses may be included in 1) occupancy and use offenses and 2) travel management restrictions on and off road offense categories. The trend from FY 2002 to FY 2006 in each of these categories has reflected a slight decrease. The decrease in law enforcement offenses reflects a change in directed priorities of the law enforcement officers (for example, personnel detailed to the Western US to assist with illegal immigration and drug situations) and a change in the numbers of forest protection officers. Qualitative information from Forest Service

employees reflects no decrease in the illegal use of OHVs on the Forest over the past three years. Following are pictures of legal and illegal ATV use on the Forest.

*Non-motorized Trails:* There have been no new non-motorized trails constructed or decommissioned during FY 2006.

*Motorized Trails:* There have been no new non-motorized trails constructed or decommissioned during FY 2006.

*Water Access Sites:* The Forest Plan allocates five new water access sites to be developed over the decade from 2004 to 2014. In FY 2006, no new access points were developed, nor were access points closed. Access opportunities, both motorized and non-motorized remained the same over the CNF.



Figure 3: Legal ATV Road Use

### **Evaluation and Conclusions:**

The work done to implement the Forest Plan and Travel Management Rule is ongoing, iterative and specifically involves many components such as roads, signs, trails and available motor vehicle use maps, and law enforcement. NEPA environmental analysis that addresses OHV motor vehicle access proposals on roads is and will be done in the future to arrive at decisions regarding legal motor vehicle access. Public information and education must be widely done to protect the social and recreational opportunities visitors coming to the National Forest participate in and also to protect the natural resources of the Forest. To date the work has involved the following:

*Closed/Open to OHVs OML 1 and 2 Roads:* Each DNR, County, and Forest Service OML 1 and 2 (or the agency equivalent) road was reviewed and recommended to be open or closed for OHV travel. The work clarified the current condition of the roads as per Forest Plan direction. Most of the OML 1 and 2 roads are short spurs, but do include some longer OML 2 roads. Each road was defined as open or closed year-round or by season. If the road was recommended for OHV access restrictions then the reason was identified. Those reasons included social and natural resource conditions, including but not limited to threatened and endangered species habitat, wet soils, and proximity to non-motorized areas.

*OML Road Designation Changes:* During the process, some roads were identified as not having the correct OML designation. Information in the corporate database (INFRA) data did not match with the actual condition and intention for the road. These changes will be made.

*Mixed Use OML 3, 4, 5:* OML 3, 4, and 5 roads were reviewed and some were identified for possible mixed use (both OHV and vehicular traffic) that would include OHVs along with

highway-licensed vehicles. These roads provide connections between the OML 2 roads and the opportunity to ride longer distances. The Forest Service will continue to analyze roads according to the mixed-use analysis process.

*Signs:* Regulatory and information signing on Forest Service, DNR, County, and Tribal roads is being reviewed with the intention that OHV signs should be as similar/same as possible across public land ownerships to benefit visitors understanding of travel opportunities.

*Trails:* Potential areas of ATV trail development have been identified across the CNF over the past year while working with DNR Trails and Waterways and County employees. These areas reflect the existing road riding opportunities; connections to opportunities; linkage to the existing cross-forest corridor trail; and proximity to rural communities. Trails will be more thoroughly explored at a later date (after the road access is defined and mapped) to further implement the Travel Rule and Forest Plan. Trail opportunities will be subject to the Environmental Assessment process.

*Forest Access Map:* The CNF will provide a motor vehicle use map for the public in January 2008.

*Law Enforcement:* Enforcement of regulations and forest orders will continue to occur over the next year.

*Forest Road Closure Order, December 21, 2006:* The Order of the Forest Supervisor Off-Road Vehicle and Snowmobile Restrictions was updated to reflect the current condition as identified by the 2004 CNF Forest Plan. These prohibitions are in addition to the general prohibitions found at 36CFR Part 261, Subpart A, and will remain in effect from the date of this order until terminated or rescinded by the Forest Supervisor.

*Non-motorized Trails:* The opportunities for non-motorized trail opportunities remain the same.

## **Recommendations:**

There are a number of short term recommendations for *motorized trails*:

- Continue collaborative planning and implementation of projects with the MN DNR, Itasca, Beltrami and Cass Counties; the Leech Lake Band of Ojibwe and interested people.
- Finalize the Off-Highway Vehicle Road Travel Access Project Environmental Assessment.
- Create the Motor Vehicle Use Map.
- Collaboratively provide a visitor use map that encompasses DNR, County and FS riding opportunities.
- Begin a planning process to provide up to an additional 90 miles of designated OHV trail.

- Monitor ORV legal and illegal use with a representative sample.
- Continue partnerships of Snowmobile Grant-in-aid trails.

Recommendations for *non-motorized trails*:

- Begin planning for the Semi-Primitive Non-Motorized trail facility opportunities to implement the Forest Plan.
- Continue partnerships with the MN DNR and Ruffed Grouse Society for hunter walking trail maintenance.
- Continue partnership for grooming of the Suomi Hills Cross Country Ski Trail system.
- Continue partnership with the National Park Service for the North Country Trail.

## **5. Transportation System**

### **Monitoring Requirement:**

To what extent is the Forest, in coordination with other public road agencies, providing safe, cost effective, minimum necessary road systems for administrative and public use?

### **Monitoring Driver:—Desired Condition and Objectives:**

D-TS-1 The existing National Forest System roads that are suitable for passenger vehicles provide a safe and affordable system for administrative and public access to NFS land.

D-TS-2 The National Forest road system is the minimum needed to provide adequate access to both NFS and non-NFS land.

D-TS-3 The transportation system design considers environmental, social, and health concerns.

D-TS-4 The National Forest road system provides a "seamless" interface with the neighboring public road agencies based on coordinated use, function, and agency goals.

O-TS-1 Improve the safety and economy of National Forest System roads and trails.

O-TS-2 Few new OML 3, 4, and 5 roads will be constructed.

O-TS-6 Decisions will be made on Forest unclassified roads to designate them as a National Forest System road or trail or to decommission them.

O-TS-7 Unneeded roads will be decommissioned and closed to motorized vehicles. Roads that are not necessary for long-term resource management are considered "unneeded".

O-TS-8 The Forest will decommission approximately 200 miles of road.

### **Background:**

Each national forest was required to analyze their main road system (the higher standard roads suitable for passenger cars) to determine the minimum road system that will support land

management objectives, provide a safe road system for the public, be responsive to the public needs, and be environmentally sound, affordable, and efficient to manage.

Policy and rules place an emphasis on maintaining and reconstructing existing passenger vehicle roads rather than building new ones, and making the existing Forest road system safe, responsive to the public needs, environmentally sound, affordable, and efficient to manage.

FY 2005 Monitoring and Evaluation Report focused on road decommissioning. This report highlights the coordination with other agencies.

**Evaluation and Conclusions:**

The Forest has been actively pursuing assistance from other road agencies to provide a safe and cost effective transportation system for the traveling public. Agreements are currently held with two of the three local counties for the maintenance of higher standard public roads. These roads are generally areas of high public use, access to residential areas, and/or provide more public traffic than administrative Forest Service traffic. The counties maintain the road systems through grading in the summer, and some roads receive snow plowing in the winter. These roads remain under the jurisdiction of the Forest Service, but maintenance is completed by the local county maintenance departments. The Forest Service has been able to financially supplement Itasca County for multiple bladings on a specific road with high ADT (Average Daily Traffic) of recreational users. The Forest can also provide material for other County maintained FS roads as a benefit to the county.

Coordination with local township boards has also occurred in regards to road maintenance. Many townships are improving their transportation systems, and in some cases are including Forest Service roads as local township roads. These roads are being verified for proper documentation regarding official jurisdiction. The Forest will continue to document all township roads located within the Forest boundary.

Road use permits are also used as a means to keep roads as safe corridors while being used to transport timber out from the forest areas and out to the lumber mills. These road use permits authorize the Forest to charge a fee to commercial logging operations for use of Forest roads. The fee is based on the amount of cords per timber sale and the length of haul on each Forest road used to remove the timber. These fees are used to restore the road to original condition after the increased truck traffic use is completed.

A large percentage of transportation system work completed in FY 2006 involved Off-Road vehicle designations. This collaborative effort involved the State Department of Natural Resources, all three counties, Leech Lake Division of Resource Management, and all local townships. The final outcome of these coordinated meetings is to provide a designated ORV route system on existing roads, which incorporates the management decisions of all the different public ownership.

**Recommendations**

Continue ongoing coordination with the State, Counties, townships and Leech Lake Band of Objibwe.

## 6. Heritage Resources

### Monitoring Question:

- Are avoidance or mitigation measures effective and being followed as recommended in project designs?
- Are heritage resources being affected in non-project areas?

### Monitoring Drivers:

O-HR-1 Identify, evaluate, protect, monitor, and preserve heritage resources.

O-HR-2 Promote heritage values in public education and outreach.

### Background:

Heritage sites within designated project areas are inventoried primarily to satisfy the requirements of the National Historic Preservation Act of 1966 (as amended). Heritage site identified within project areas are monitored subsequent to inventory for the purposes of determining whether or not recommended mitigation measures are implemented by the functional area responsible for the project and to document whether or not the recommended mitigation was effective in protecting the heritage resource.

There have been no previous systematic monitoring efforts for heritage resources, but field visits were sometimes done opportunistically, especially to highly visible publicly known sites. Monitoring was not required by the 1986 Forest Plan but is required by the 2004 Forest Plan.

### Monitoring Activities:

#### *Avoidance or mitigation measures effectiveness*

In FY 2006, a new protocol for monitoring heritage resource sites was developed. A review by Forest staff of completed prior-year timber sales to identify areas of “flag and avoidance” cultural resource sites was recommended. A field visit to verify that the recommendation was carried out and that there are no unexpected effects was done for several sites. Avoidance or mitigation measures were effective and were being followed as recommended in project designs in the project areas that were visited.

#### *Heritage resources in non-project areas*

A field check of highly visible sites, and those known to the public, as well as coordination with law enforcement to monitor unauthorized digging, vandalism or unplanned disturbance was required. A few sites in non-project areas were examined and no disturbance was noted to archeological sites. Some maintenance deficiencies were noted for historic buildings at Rabideau CCC Camp and some of these have been corrected. The Blackduck District Ranger was notified of unauthorized digging of a latrine that disturbed an archeological site (#09030200240) in an area under special use permit for traditional gathering.

Information on site reviews is kept in files on the Forest. A database is not available or in use to document site visit and results.

**Evaluation and Conclusions:**

It appears efforts to avoid and/or protect sites have been effective. However, it is premature to note any trends, conclusions or recommendations at this time.

## ***7. Tribal Rights and Interests***

**Monitoring Questions:**

- Is Forest management helping to sustain American Indians' way of life, cultural integrity, social cohesion, and economic well being?
- Are government to government relationships functional?
- Is the Forest facilitating the right of the Tribe to hunt, fish, and gather as retained via treaty?

**Monitoring Driver:**

D-TR-1 Lands within the Forest serve to help sustain American Indians' way of life, cultural integrity, social cohesion, and economic well-being.

D-TR-2 The Forest Service continues to work within the context of a respectful government-to-government relationship with Tribes, especially in areas of treaty interest, rights, traditional and cultural resources, and ecosystem integrity. The Forests provide opportunities for traditional American Indian land uses and resources.

D-TR-3 The Chippewa National Forest facilitates the exercise of the right to hunt, fish, and gather as retained by Ojibwe whose homelands were subject to treaty in 1855 (10 Stat. 1165). Ongoing opportunities for such use and constraints necessary for resource protection are reviewed and determined in consultation with the Leech Lake Band of Ojibwe.

O-TR-1 Improve relationships with American Indian tribes in order to understand and incorporate tribal cultural resources, values, needs, interests, and expectations in forest management and develop and maintain cooperative partnership projects where there are shared goals.

O-TR-2 Maintain a consistent and mutually acceptable approach to government-to-government consultation that provides for effective Tribal participation and facilitates the integration of tribal interests and concerns into the decision-making process.

O-TR-3 The Forest Service will work with the appropriate tribal governments to clarify questions regarding the use and protection of miscellaneous forest products with the objective of planning for and allowing the continued free personal use of these products by band members within the sustainable limits of the resources.

O-TR-4 Consult, as provided for by law, with Tribes in order to address tribal issues of interest and National Forest management activities and site-specific proposals.

**Background:**

The Chippewa National Forest has a role in maintaining rights preserved by treaties because it is an office of the federal government responsible for natural resource management on land subject to these treaties. Government-to-government consultation is ongoing between the Forest Service and the Leech Lake Band of Ojibwe who were signatory to the Treaty of 1855, however monitoring the status or progress of this consultation is new.

A 1993 Memorandum of Understanding (MOU) between the Forest and the Band also speaks to cooperation and forming management partnerships together. The Forest Plan directs implementation of the MOU by providing goals, objectives, standards and guidelines on consultation and interaction between the Forest and the Band. The previous Forest Plan (1986) did not specifically address the relationship, treaties or monitoring of activities that affect the Band.

Tribal Resolution 00-80 authorizes the Director of Leech Lake Division of Resource Management to be the official representative and primary contact in all US Forest Service matters. In a letter to the Band in 2003, Under Secretary for Natural Resources Mark Rey committed the Forest Supervisor to be the point of contact for government-to-government relations in lieu of a designated Tribal Liaison.

Tribal Rights and Interests were not previously monitored under the 1986 plan. This is a new element that was incorporated into the 2004 Forest Plan.

**Monitoring Activities:**

There is not a well established protocol on what or how to monitor tribal rights and interests to determine if the Forest Plan desired conditions and objectives are being met. At this time, an effort is being made to identify and track the commitment and consultation activities that occur on the Forest. A database is not established or used to store and track these activities.

During FY 2006, the Chippewa conducted the following activities:

- Made a written commitment to establish a Tribal Liaison position.
- Made a written commitment to establish an inter-governmental MOU coordination committee between the FS and the Band.
- Facilitated key introductions and relationship building between Tribal and Forest Service Leadership throughout the year for Regional Forester, Regional Tribal Relations Coordinator, Office of General Counsel, Acting/Transitional Forest Supervisor, and new Chippewa Forest Supervisor.
- Participated with the Band in their International Forestry Management Conference interview.
- Solicited tribal input on a national proposal for Ash Seed Collection.
- Initiated the Band's participation in OHV Road Designation Planning
- Contacted Division of Resource Management and Local Indian Councils (15 exist):

- to discuss project planning and current project implementation efforts and identify concerns, and
- to identify any historic sites or traditional uses within the project areas.
- Provided a unique Traditional Resource Inventory program involving formal collection of information related to Traditional Cultural Properties. A GIS database is now available for use in project planning.
- Conducted formal archeological surveys. Beginning in 1986, the Forest helped train Leech Lake Band of Ojibwe staff to conduct these surveys. The Forest continues to contract that work through the Band.

**Evaluation and Conclusions:**

During FY 2006, records of interactions with tribal government provided background and feedback that allowed Chippewa National Forest to better assess if the indicators measure how well we are sustaining and facilitating relationships, rights and American Indian well-being.

During transitions of leadership, tribal relations continued to be a priority. Connecting key leaders from both governments helped address key issues that may have potential to disrupt relations.

Progress was made on commitments from FY 2005. The Chippewa conducted outreach and advertisement for a Tribal Liaison position in FY 2006. A Program of Work is to be established in FY 2007 in cooperation with the Band, and a Memorandum of Understanding is to be established. Each of these items help establish mutual measures and expectations in support of resource management, opportunities for partnering to accomplish Forest Plan objectives, and strengthen government--to--government relations.

## ***8. Public Health and Hazardous Materials***

**Monitoring Question:**

Are Forest facilities and recreation sites safe for employee and public use and enjoyment?

**Monitoring Driver:**

O-PH-4 Forest owned facilities and designated recreation sites and/or natural resource amenities are inspected and managed to ensure safe operation.

**Background:**

*Recreation Facilities*

Forest facilities and recreation sites information is stored in the national INFRA database. INFRA provides an integrated data management tool where Forests can enter, manage, and report accurate information and associated financial data on the inventory of their constructed features - features such as buildings, dams, bridges, water systems, roads, trails, developed recreation sites, range improvements, administrative sites, heritage sites, general forest areas and wilderness.

There are national key measures with associated performance standards that address the operation and maintenance of Forest Service sites. The key measures that affect the safety of facilities and recreation sites are health and cleanliness; safety and security; and responsiveness. These are reflected in the corporate INFRA database. Critical operation and maintenance standards within these key measures must be met prior to opening the facilities to the public. The following are the standards and key measures.

Health and cleanliness critical standards expect that:

- Visitors are not exposed to human waste.
- Water, wastewater, and sewage treatment systems meet federal, state and local water quality regulations.

Safety and security critical standards expect that:

- High-risk conditions do not exist in recreation sites.
- Utility inspections meet federal, state, and local requirements.

Responsiveness critical standard expect that:

- When signed as accessible, constructed features meet current accessibility guidelines.

The attainment measure is the measure of capacity provided to National Standard. The unit of measure is People-at-One-Time (PAOT) days to Standard. Each site has an established PAOT and the attainment measure is the number of days the national standards are met for a site, times the PAOT. Meeting the minimum national required tasks represents meeting 50% of all the tasks required to meet the full National Standards. Performing additional tasks will increase the attainment report output proportionally.

### *Forest Facilities*

The Forest has a current HAZMAT Plan that provides detailed safety guidelines and instructions for receipt, use and storage of chemicals at our facilities by employees and contractors.

Each FS office has an Occupant Emergency Safety Plan or a Safety Plan in place. The primary purpose of these Plans is to minimize danger to life and property due to emergencies such as fire, bomb threats, demonstrations, natural disasters, emergency closing of offices, and other emergency situations. These plans, correctly used, will help FS employees cope with emergencies should one arise.

### *Law Enforcement*

Law enforcement continues to employ two full time Law Enforcement Officers, 21 Forest Protection Officers all year round; and a part time County Sheriff's Deputy during the summer months. Law enforcement personnel provide in part, for the safety of Forest visitors and employees. Violations, warnings and incidents are tracked in the National database, LEIMARS.

### **Monitoring Activities:**

All employees have been informed of the contents of the HAZMAT Plan and the Occupant Emergency Safety Plan and Safety Plans over this past year.

The facilities have been monitored and maintained to standard. Additionally, safety has been enhanced with added security features at each office.

All recreation facilities have been and continue to be monitored for compliance with national standards. There is an initial assessment prior to opening of facilities (Recreation Site Preseason Safety Inspection) and throughout the season by professional Forest Service Recreation employees.

Law enforcement employees directly monitor behavior related to the safety of visitors and employees.

The following table illustrates the law enforcement annual report utilizing LEIMARS records by incident type for those incident reports, warnings and violation notices that have been written in FY 2005 (the latest year available) that may affect people and forest facilities.

**Table 12.** Law enforcement annual report by incident type for 2005 (last year available).

LEIMARS Records by Incident Type	Incident Report/Warning	Violation Notice	All
Alcohol	2	3	5
Assault	1	0	1
Drug Production/Use	1	0	1
Fire	33	2	35
Forest Roads/Trails	39	4	43
OHV	60	11	71
Occupancy Use	304	25	329
Real Property	28	1	29
Sanitation	58	3	61
Threats/Intimidation	1	0	1

### Evaluation and Conclusions:

The outcome of monitoring is potential change in management within the context of the Forest Plan. Information gathered during this year's monitoring process has not been gathered in prior years under the 1986 Forest Plan. Initial information establishes the baseline for the next decade.

The key measures associated with safe facilities and recreation sites are health and cleanliness; safety and security; and responsiveness. The recreation facilities are maintained at a minimum to meet the key standards, in addition to meeting other standards. Meeting these minimum standards represents 50% of all tasks required. There is an additional 23% attainment by meeting additional standards for a total of 73% of the recreation sites operated to standards.

Recreation employees monitor daily the condition of the campground facilities and other Forest facilities. Any change in condition regarding meeting minimum standards is taken care of immediately.

All employees have been informed of the contents of the HAZMAT Plan and the Occupant Emergency Safety Plan or the Safety Plan over this past year.

The ability to correlate historical LIEMARS records specifically with the safety of facilities and people using them is not something that can be directly gleaned from the Law Enforcement Annual Report. So in general, law enforcement personnel have responded to a number of incidents through the year that involved people possibly in the proximity of NF facilities. However in general, the incidents have declined from FY 2004 to FY 2005 by approximately 8%. The ten most frequently occurring offenses are:

- Dumping refuse or garbage
- Possess or use vehicles off road
- Cutting or damaging trees or timber
- Using vehicle on road closed by order
- Damage to property or natural features
- Causing timber, trees or brush to burn
- Failure to pay recreation fee
- Hunting, trapping, fishing in violation
- Removing any natural feature

**Recommendations:**

The Forest will continue to move toward the desired condition as outlined in the Forest Plan. To do so:

- Information and education should continue to be effective sources of safety information regarding facilities for both employees and visitors.
- The Occupant Emergency Safety Plan or the Safety Plan should be reviewed, updated, and made available to employees every year.
- The level of Law Enforcement personnel and allocated time should be increased.
- The recreation budget should be increased to manage recreation facilities to full standards, increasing the safety of the sites for employee and public use.

**Monitoring Question:**

Does water in Forest-provided drinking water sources and swimming beaches meet standards of quality protective of human health and aesthetics?

**Monitoring Driver—Desired Condition and Objectives:**

O-PH-1. Public and non-public water and wastewater systems are updated, maintained, and managed to the standards set forth in the appropriate federal guidelines and applicable state standards during this plan period.

**Background:**

The objective of the Forest Service Drinking Water Program is to protect the health of the public and Forest Service personnel by ensuring that water provided by the Forest Service for human consumption at any administrative site or public-use area is both safe and protected. Monitoring has occurred for years in accordance with State and Forest Service direction. Monitoring occurs for drinking water, swimming beaches, and Norway Beach sewer plant.

## Monitoring Activities:

### *Drinking Water*

Monitoring of drinking water supplies consists of collecting and analyzing well water samples from all designated drinking water sources operated by the National Forest. Monitoring protocols are documented and records are kept in compliance with Forest Service Manual and the Minnesota Department of Health requirements. Monitoring plans have been developed for each of the 43 designated water sources on the Forest. Individual wells are monitored on an annual or monthly basis, by FS employees, depending on requirements in the monitoring plan for each well. Samples are tested for total coliform bacteria, *E. Coli* bacteria, and nitrates. If any sample exceeds the limits for Forest and State Safe Drinking Water standards, corrective action is taken. When corrective action is taken, the wells are closed and are not re-opened until sampling shows that they are in compliance with EPA regulations.

The Minnesota Department of Health also requires that sanitary surveys be conducted every 3 years on non-community transient wells and non-community nontransient/Forest Service wells, and every 5 years on non-public wells for all scheduled water systems. At the end of FY 2006 all systems were on schedule. The Department of Health also requires that we have an Operation and Maintenance Plan for all designated drinking water sources operated by the National Forest. Operation and Maintenance Plans have been developed for supplies that have hand pumps and a pressure system at Norway Beach. Operation and Maintenance plans for five other Well Pressure Systems still need to be completed. One well will be abandoned in 2007.

Data is stored in the Infra database, is also reported to MN Department of Health and can also be accessed at: [http://www.epa.gov/enviro/html/sdwis/sdwis\\_query.html](http://www.epa.gov/enviro/html/sdwis/sdwis_query.html).

In FY 2006, a total of 509 samples were analyzed from 45 wells. All wells in FY 2006 were below the Forest and State drinking water standard of 10mg/L Nitrate nitrogen. Five wells tested positive for total coliform bacteria. Corrective action was taken for each incident.

The drinking water system on the Forest provides safe drinking water supplies for visitors and employees.

### *Natural Swimming Waters (Beaches)*

The objective of sampling for bacteriological water quality is to insure safe water for designated primary contact recreation (swimming) areas (FSM 2532.02). Monitoring is done in compliance with Forest Service policy and direction. There are no State or EPA requirements to monitor swimming areas. Monitoring of water provided for primary contact water sports must be done to ensure public health and safety. Previously the Forest tested swimming beaches for fecal coliform bacteria. More recent epidemiological studies (Cabelli 1983, Dufour 1984) described in Ambient Water Quality Criteria for Bacteria— 1986 (EPA, 1986a), “indicate that *E. coli* and enterococci show a direct correlation with swimming-associated gastrointestinal illness rates, while fecal coliforms do not. As the concentration of *E. coli* and/or enterococci increase(s), the illness rates also increase. Thus, using these indicators as part of the bacterial water quality standards will enhance the protection of human health and the environment”.

FS employees take samples on a monthly basis during the summer. As a result of this information, the Forest has switched to testing for enterococci at designated swimming areas. In FY 2006, 106 samples were analyzed from 12 swimming areas. Four samples were initially above the threshold but on re-sampling were within safe limits.

Monitoring samples and data are stored in files at the Supervisor's Office. Currently a database is not available for the data.

#### *Norway Beach Sewer Plant Testing*

The Forest monitors influent, effluent and groundwater quality at the sewer plant which treats wastewater from the Norway Beach campground. This testing is done to comply with Minnesota State Pollution Control Agency (MPCA) requirements. Nearly 400 tests were completed during FY 2006 in accordance with MPCA protocols. Results of the testing showed that the plant was in compliance for the 2006 season. (Details on the sampling parameter and schedule are available upon request.)

Samples are taken by FS employees on a monthly basis. Information is stored in files on the forest; there is no database available.

#### **Evaluation and Conclusions:**

The results of annual water sampling efforts show that the Forest is providing for the health and safety of visitors and is in compliance with State and Forest Service direction for potable water, swimming beaches, and waste water effluent.

#### **Recommendations:**

The Forest should continue developing a Forest Service Manual Supplement that defines required procedures to follow when beach samples are above the established threshold for enterococci. Operation and Maintenance Plans should be developed for the five water systems that do not have them yet.

#### **Monitoring Question:**

"Does hazardous material storage on NF meet standards of quality protective of human health?"

#### **Monitoring Driver—Desired Condition and Objectives:**

O-PH-2 Hazardous materials are appropriately stored in approved facilities, and are transported safely if necessary for forest management.

#### **Monitoring Activities:**

- Annual safety audits were conducted by FS personnel on each of the districts and at the SO to insure compliance with applicable regulations. The information collected as part of these safety audits is recorded to monitor accomplishments and identify opportunities for improvement.
- Approximately 1,200 lbs of hazardous waste and two 55 gallon barrels of hazardous material was removed by contract from our HAZMAT inventory.

#### **Evaluation and Conclusions:**

- Initial safety audits identified a lack of adequate HAZMAT storage which was resolved by purchasing several HAZMAT storage cabinets. Subsequent follow-up coordination identified additional opportunities for improvement on the proper storage of hazardous materials.
- A hazardous communication plan (HAZCOM) was written and implemented to provide clarification on proper identification of hazardous materials and appropriate spill response procedures. Issues addressed in the HAZCOM plan include but not limited to the following:
  - Training requirements
  - Transportation of hazardous materials
  - General safety
  - Risk Assessment / Management
  - HAZMAT storage
  - Emergency response protocol
  - Housekeeping
  - MSDS (material safety data sheets)
- HAZMAT response kits were purchased and located at district offices and smaller portable spill kits were provided for several FS vehicles

**Recommendations:**

- Initial objectives referenced above were met, but will require ongoing efforts and resources to maintain compliance with OSHA and FS regulations. These resources would be focused on training exercises and funding for additional HAZMAT storage cabinets.
- Partnerships have been established with the MPCA (Minnesota Pollution Control Agency) in drafting of the HAZCOM plan as well as initial and follow-up training.

## **9. Timber**

**Monitoring Question:**

Are harvested lands adequately restocked after five years?

**Monitoring Driver:**

(36 CFR 219.12(k)[5][i]. Lands are adequately restocked as specified in the forest plan.

**Background:**

National Forest Management Act (NFMA) regulations require that cutover lands be adequately restocked within five years. Stocking surveys on regenerated stands are conducted the first five years after harvest to assess stocking levels. Regeneration may occur naturally or by planting or seeding.

## Monitoring Activities:

Table 13 displays various reforestation treatments accomplished on the Forest in FY 2006, including release and animal damage control on newly planted sites.

**Table 13:** Reforestation Treatments in FY 2006

Treatment	Acres
Planting	944
Seeding	24
Site Prep for Natural Regeneration	638
Natural Regeneration w/o Site Prep	524
Site Prep for Planting or Seeding	493
Release	2,141
Animal Damage Control	2,520
<b>Total Regeneration Treatments</b>	<b>7,284</b>

One hundred sixty-two stocking surveys were conducted on 2,523 acres across the forest in FY 2006. Generally it takes several years for stands to become established. Once established and adequately stocked, stands can be certified. Certification is based on a minimum of at least a 1<sup>st</sup> and 3<sup>rd</sup> year stocking survey. Often a 5<sup>th</sup> year is required prior to certification. Where stocking is inadequate, as specified in the

silvicultural prescription, follow-up activities are prescribed that may include additional site preparation and/or possibly planting. Scheduling of surveys occurs using the FACTS database. Survey and certification accomplishments are also reported in FACTS. Survey data collected is loaded into FSVEG.

## Evaluation and Conclusions:

Following the stocking surveys, 848 acres of reforested land were certified as satisfactorily stocked. Table 14 displays the classifications of these certifications.

**Table 14:** Certifications Summary for FY 2006

Certification Activity	Sites	Acres
Certification of Natural Regeneration with Site Prep	12	167
Certification of Natural Regeneration without Site Prep	31	524
Planted areas certification	11	157
<b>Total Certifications</b>	<b>54</b>	<b>848</b>

Four hundred sixty-eight acres that are inadequately stocked are scheduled for fill-in replanting or fill-in reseeded in FY 2007 (399 acres replanting, 69 acres reseeded).

## Monitoring of Regeneration Success in Lowland Conifers:

For several years there has been concern, by some, that lowland conifer stands fail to be adequately regenerated on the Chippewa National Forest following harvest. In recent years this resulted in a hesitancy to prescribe harvests in black spruce, tamarack, and mixed lowland conifer types. In FY 2005, a commitment was made by the silviculturists on the Forest to sample harvested lowland conifer stands to determine stocking levels. Data was analyzed to determine the probability of successfully regenerating lowland conifer types on the Forest. Also, a better understanding of how these lowland conifer types are distributed regarding density, species composition and between species correlations would be gained. A summary is provided here. A more detailed report is available upon request.

## Methods:

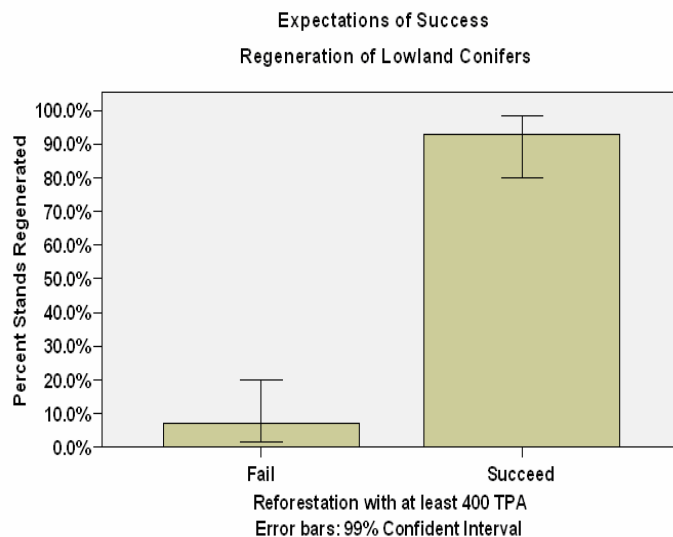
Sampling was conducted in stands that were at an age where they should be certified (5 years), but where stands were still in the regeneration phase. A query was run against CDS (Corporate Data System database) for forest types “tamarack”, “black spruce”, and “mixed swamp conifer”. Stands 5-15 years old were selected. This resulted in a set of 82 stands totaling 1,317 acres. A subset of 54 stands was inventoried due to time limitations, using Forest stocking survey protocols for Common Stand Exam.

The sample design consisted of two sample expansion factors. A 1/100<sup>th</sup> acre fixed radius plot was used to measure trees below 4.5 feet tall, and trees from .01” to 4.49” diameter at breast height (DBH). A 10 factor angle gauge was used to measure trees with a DBH of 5.0” and larger. Plot data was collected and loaded into FSveg. Stocking reports were produced and the data from these was transferred to an Excell spreadsheet and an SPSS (statistical analysis package) data file. Excell and SPSS v.14 were used for descriptive statistics. SPSS v.14 was used for inferential statistics. The questions tested were:

- Can lowland conifers be successfully regenerated following harvest on the Chippewa National Forest?
- Is there is a difference in success between artificial seeding and natural seeding methods in these lowland conifer types?
- Are there relationships (correlations) that exist in the stands between species?

## Discussion:

*Can lowland conifers be successfully regenerated following harvest on the Chippewa National Forest?*



Analysis indicates that there is a very high probability that harvested lowland conifer stands will be regenerated. The Forest has a 99% confidence (probability) that it can successfully regenerate harvested lowland conifers 92.6% of the time, plus or minus the range within the confidence interval bar (Figure 4). Failures do occasionally occur however and these need to be addressed. The reasons why they occur may be related to the fact that NFMA requires certification within 5 years following harvest. This is often a difficult

Figure 4: Probability of success.

timeframe to meet even on upland sites. Lowland conifer types are regenerated using seed, either naturally or artificially dispersed. This means it takes longer to get trees established than planting. These young seedlings are also very vulnerable to site conditions. With a sphagnum seedbed young seedlings are subject to desiccation during dry years. Even if a stand is certified at five years, the seedlings are generally small in size. A dry year following certification could wipe out regeneration. Since these are wetlands, they are also subject to flooding from beaver activity. This can have the same effect regarding mortality.

Extended monitoring could help improve success. Lengthening the time for monitoring from five to ten years, and adding an additional stocking survey, would increase the Forests already high probability of success to regenerate these lowland forest types. Stands would be monitored through stocking surveys for a longer period of time. This additional monitoring would alert reforestation technicians to problems that arise allowing corrective actions to be taken beyond the traditional 5 years. Seedlings at ten years of age are in a better state to continue to grow than seedlings of 5 years or less in age.

*Is there is a difference in success between artificial seeding and natural seeding methods in these lowland conifer types?*

An independent sample t-test was used to determine if there was a difference in seedling densities in stands that were naturally seeded and those artificially seeded. The tree density in stands naturally seeded (mean=4,103 trees per acres (TPA)) was not significantly different from the density of stands artificially seeded (mean=6,837 TPA), ( $t(49) = -1.01, p > .01$ ). Thus, evidence was not found that a difference exists in the mean tree density of stands regenerated by artificial seeding when compared to stands regenerated by natural seeding. The fact that the end result of both of these treatments is not statistically different may indicate that the correct decisions are being made regarding regeneration methods being used on a stand by stand basis.

*Are there relationships (correlations) that exist in the stands between species?*

Significant correlations were found between species densities. Exactly what these indicate is not known. It may be that species that are positively correlated have similar site requirements. Perhaps the presence of one species may indicate that another positively correlated species would also do well on the site. Further study beyond the scope of this exercise would be required to understand these relationships.

## **10. Insects and Disease**

### **Monitoring Question:**

Are insects and diseases populations compatible with objectives for restoring or maintaining healthy forest conditions?

### **Monitoring Driver—Desired Condition and Objectives:**

(36 CFR 219.12(k)[5][iv]. Destructive insects and disease organisms do not increase to potentially damaging levels following management activities.

D-ID-3 Native insects and diseases are present and fulfilling their ecosystem function. Epidemics, when they occur, do not last longer than would be expected in a healthy ecosystem.

O-ID-1 Increase the amount of forest restored to or maintained in a healthy condition to with reduced risk of and damage from fires, insects, and diseases.

D-VG-5 Vegetation constantly changes through management activities and through naturally occurring disturbances and ecosystem recovery processes such as wind, fire, flooding, insects, disease, and vegetation succession. These fluctuations are within an ecologically and socially acceptable range of variability.

D-VG-8 The ecological processes of native vegetation communities are maintained, emulated, or restored at multiple landscape scales to provide representation of their natural range of distribution and variation within context of multiple-use goals and ecosystem sustainability. These include: processes such as disturbance from fire, wind, flooding, insects and disease; biological community and species interactions; nutrient cycling; and vegetation succession.

O-VG-11 Increase amount of a variety of prescribed burning practices to restore the ecological process of fire and provide habitat for threatened and endangered species and other wildlife that benefit from or require burned vegetation.

O-VG-12 Retain an adequate representation of naturally disturbed forest that is not salvaged, such as burned, flooded, blowdown, or insect- or disease-killed areas. Maintain these in a variety of patch sizes and distributions on the landscape.

O-VG-13 Where natural disturbances, human influences, or stand age or composition have combined to perpetuate stands that are brush-dominated or have sparse tree canopy on sites that could otherwise provide productive timber management opportunities, and where there may be adequate ecological representation of these types of conditions, seek to re-establish adequately stocked stands to address timber management objectives.

**Background:**

The 2004 Forest Plan identifies insect and disease populations and trends as an annual item to be monitored and reported. Past Monitoring and Evaluation Reports since 1987 discuss agents, changes in populations and the need for management actions.

**Monitoring Activities:**

Each year in July the Minnesota Department of Natural Resources (DNR) conducts aerial surveys to monitor forest health. This aerial survey is used to monitor the most apparent effects of damage agents to forest health. Supporting information can be found on the DNR Forest Health website: [http://www.dnr.state.mn.us/treecare/forest\\_health/index.html](http://www.dnr.state.mn.us/treecare/forest_health/index.html).

**Evaluation and Conclusions:**

**Table 15.** Acres affected by agent, forest type and severity.

AGENT NAME	ACRES AFFECTED 2006	ACRES AFFECTED 2005	ACRES AFFECTED 2004
Bark beetles	4	0	0
Flooding	148	258	22
Jack pine budworm	2,322	1,368	274
Larch beetle	250	0	0
Larch casebearer	255	351	83
Unknown	509	198	3,998
Porcupine Damage	0	2	13
Spruce Budworm	0	0	155
Two-lined chestnut borer	0	341	0
Abiotic	0	912	0
HOST FOREST TYPE			
Balsam Fir	42	0	155
Hardwoods	411	75	1,736
Jack Pine	2,322	1,346	274
Red Pine	13	24	16
Softwoods	141	0	3
Tamarack	560	733	696
Oaks	0	342	0
Aspen	0	912	656
Birch	0	0	222
Black Ash	0	0	366
Unknown	0	0	423
SEVERITY			
Trace	673	257	2,339
Light	541	3,133	1,994
Moderate	2,246	12	46
Heavy	29	30	167
Differences in acre totals between categories is due to rounding.			

The 2006 survey results for the Chippewa National Forest are summarized in Table 15. A corresponding map showing locations of damage is displayed in Figure 5. These aerial surveys record currently active damage. For example, jack pine affected by jack pine budworm in 2005 is not included in the figures for 2006. The figures represent new or previously unaffected areas.

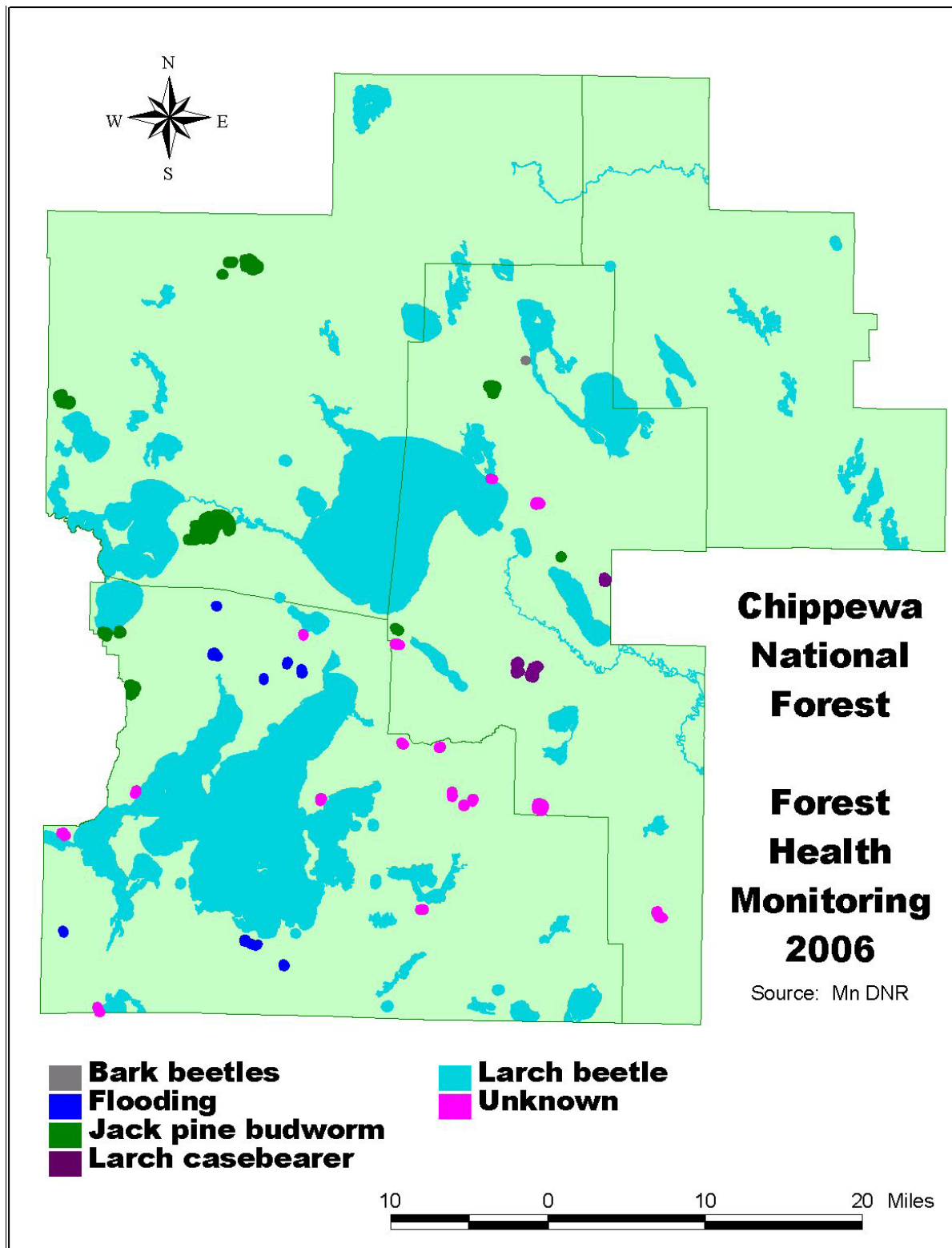


Figure 5: Results from MN-DNR 2006 Forest Health Survey.

**Jack pine budworm:**

In monitoring it is important to watch for trends. Jack pine budworm (JPBW) has affected jack pine in Minnesota throughout its range for the past several years. Note the increase in acres affected from 2004-2006 for jack pine and jack pine budworm. The upswing in populations is a natural cycle of this native defoliator. In 2004, jack pine budworm reached the western edge of the Chippewa National Forest with approximately 274 acres being affected. These stands were all located around the Pike Bay area. In 2005, 1,368 acres were detected by the same DNR aerial survey. Acres affected by JPBW in 2006 increased to approximately 2,322 acres. Egg mass surveys done in 2005 indicated the population of JPBW should be expected to decline. So far, that has not occurred.

The other trend worth noting is the shift in acres from lower to higher severity classes. This is largely due to a movement of jack pine budworm affected acres from the “trace” and “light” categories to the “moderate” category. There are currently 12,111 acres of jack pine on the Chippewa in all age classes. This data indicates that over 19% was affected by jack pine budworm in 2006. If the acres for 2004, 2005 and 2006 are added they total 3,789 acres. These cumulative acres represent over 31% of the Forest’s total jack pine acres.

**Gypsy Moth:**

In 2006, the Minnesota Department of Agriculture (MDA) and USDA-APHIS set 370 Gypsy Moth traps within the Chippewa National Forest. Most of these were set on a grid. Thirty-three included 4 delimit traps, 20 mill traps and 9 at high density use areas such as campgrounds. No moths were recovered from traps set on the Chippewa National Forest in 2006.

**Emerald Ash Borer:**

As time passes, Emerald Ash Borer (EAB) becomes an increasing threat to the Forest’s ash resource. This non-native invasive has been the focus of much coordination in Minnesota in 2006. Partners, with the Minnesota Department of Natural Resources at the lead, are developing a strategy to limit the movement of firewood. This is a medium on which EAB is transported to new locations.

In 2006, monitoring for EAB began on the Forest, led by the State & Private Forestry Office in St. Paul. Visual surveys were conducted at the following recreation sites: Knutson Dam Recreation Area, Norway Beach Recreation Area, South Pike Bay, Winnie, Deer Lake, Mosomo Point, Onegume, Seelye Bay – East and West, Tamarack Point, Williams Narrows, Clubhouse and North Star. As a result of these visual inspections, no EAB were found and no suspect trees were reported.

In addition to visual inspections, three trap trees (girdled trees) were established at Stony Point Campground on May 25, 2006. The trap trees would attract any beetles in the area. Bark will be peeled from these trees and examined for the presence of EAB. The first of these trees will be peeled and sampled in the spring of 2007, with the remaining two trees being peeled and sampled in late September, 2007. The goal is to establish additional trap trees in 3-5 more campgrounds on the Chippewa in the spring of 2007.

**Recommendations:**

At this time, insects and diseases populations are compatible with objectives for restoring or maintaining healthy forest conditions. Surveys, trapping results, and on the ground visits do not indicate upswings in population trends that warrant management concern or actions. However, the affects of jack pine budworm need to be monitored over time. In areas where project activities are currently being planned, analysis of jack pine budworm effects within the project areas, if they are present, need to be considered in the development of alternatives.

## **11. Fire**

**Monitoring Question:**

How, where, and to what extent will prescribed fire be used to maintain desired fuel levels, and/or mimic natural process, and/or maintain/improve vegetation conditions, and/or restore natural process and functions to ecosystems?

This report is focused specifically on the response of blueberry plants to harvest treatments and prescribed fire. The desired conditions and objectives have been narrowed to those that would apply to the focus of the monitoring.

**Monitoring Driver—Desired Condition and Objectives:**

D-ID-5 Fire is present on the landscape, restoring or maintaining desirable attributes, processes, and functions of natural communities.

O-ID-2 Establish, maintain, or improve the condition of vegetation conditions using prescribed fire, mechanical treatments, and other tools.

O-ID-4 Reduce fuels and control vegetation in the understory of stands that have historically had naturally occurring low intensity surface fires.

**Background:**

Blueberries are a traditionally gathered resource that was much more common decades ago than now (according to verbal accounts from local residents). A common theme in discussions with the public about vegetation management projects is the need to increase the production of native blueberries. In an attempt to do this, in the Sand Plains project (2003) several stands were planned for harvesting (thinning and shelterwood cutting) and burning that would favor blueberry plant growth. Objectives in the Sand Plains project included: use fire to enhance blueberry resources and to reduce competitive vegetation, and improve forest conditions to support traditional uses and subsistence gathering opportunities. Harvesting has been accomplished in three stands and monitoring plots were installed. The residual trees are large enough to withstand understory burning. Introducing fire into these stands would maintain fairly open stands with reduced brush competition, which should provide good areas of blueberry production.

This project is being implemented to meet two of the ideas under Region 9's Courageous Conservation Strategy: Connecting citizens to the land by providing resources that have been

traditionally gathered and "Walking the talk for sustainability" by increasing production of a plant that has decreased recently.

### **Monitoring Activities:**

Three sets of plots for monitoring changes in blueberry production were established in 2004 in three stands on sandy soils near Cass Lake. (A fourth and fifth set of plots are in stands that are yet to be harvested.) Two of the stands had been harvested prior to establishing the plots and they subsequently received mechanical scarification for site preparation (one was also burned), so the effect of this can be seen on the blueberries. No further treatments are planned. The third stand is the best of the blueberry stands. It was harvested shortly after the plots were established but is still waiting for the prescribed burning, which is now planned for FY 2007.

Monitoring by Forest Service personnel occurred in July/August of 2004, 2005, and 2006 when plants are easily visible. Numbers and sizes of plants were counted in 224 plots. Comparisons between years was made for the number of plants in the plots and for the number of plots that contained plants to see if new plants were becoming established and if old ones grew.

Data collected has been entered into a local spreadsheet since a corporate database is not available.

### **Evaluation and Conclusions:**

**Table 16.** Number of plots and blueberry plants per plot by year.

	<b>2004</b>	<b>2005</b>	<b>2006</b>
Total Blueberry Plants on Plots	40	25	20
Total Plots with Blueberries	13	10	7

As the table shows, the number of blueberry plants and the number of plots with blueberry plants have both decreased in the 224 plots in the three stands from 2004 to 2005 and again to 2006. Some of this loss was due to scarification damage from the logging and some from later site preparation in one stand. However, the major cause of the loss seems to be that no followup treatments (burning) have been done in two of the three stands, so the shrubs, grass, and forbs have become quite dense. Prescribed burning was limited the last two years by drought conditions that prevented the ignition of prescribed burns when they were needed in these stands. The dense understory has smothered some of the plants and has prevented any new ones from becoming established, except in rare open spots where some new plants have appeared. It is also obvious that there was not an abundance of plants at the beginning, even though these are stands with sandy soil and pine overstories that should be good for blueberries. Sizes of plants did not change enough to measure so is not reported.

The conditions of the overstory after the harvesting are well-suited for blueberries, but the dense understory counteracts this. The objective of increasing blueberry production has not been met in this area because the full range of prescribed treatments has not been implemented.

**Recommendations:**

The remaining post-harvest activities (prescribed fire) should be conducted. It appears that without fire the objectives for blueberry production will not be met. Monitoring of blueberry plots was scheduled to continue through FY 2006. The monitoring schedule should be extended to continue monitoring for at least two years after burning is complete. If the results of this monitoring do not show increases in blueberry production, then harvest and post-harvest activities used to promote blueberries should be re-evaluated. Monitoring for blueberries elsewhere on the forest should be considered to obtain a more representative sample and statistical basis.

In the future, the forest should assess the role of fire on the forest landscape by addressing the number and acres of fire treatments planned and number and acres implemented.

## **12. Vegetation, Vegetation Composition and Structure**

**Monitoring Questions:**

To what extent is the Forest providing a full range of vegetative communities that address diverse public interests and needs while contributing to ecosystem sustainability and biological diversity?

To what extent is Forest management, natural disturbances, and subsequent recovery changing vegetation composition and structure? To what extent are conditions moving toward short-term (1-20 years) and long-term (100 years) objectives at Landscape Ecosystem, Management Area, and other appropriate landscape scales?

**Monitoring Drivers—Desired Condition and Objectives:**

D-VG-1 Native vegetation communities are diverse, productive, healthy, and resilient.

D-VG-2 Vegetation conditions contribute to ecosystem sustainability and biological diversity. They address current and future generations' needs for and interests in the many aesthetic, spiritual, consumptive, commodity, recreational, and scientific uses and values of forests.

D-VG-3 Vegetation (live and dead) is present in amounts, distributions, and characteristics that are representative of the spectrum of environmental conditions that would have resulted from the natural cycles, processes, and disturbances under which current forest ecosystems and their accompanying biological diversity evolved. The ecosystem composition, structure, and process representation considers time frames, a variety of landscape scales, and current biological and physical environments. Resource conditions exist that minimize undesirable occurrences of non-native invasive species.

D-VG-4 Tree vegetation is present in amounts, distributions, and characteristics that allow contribution to a sustained yield of timber and pulpwood products.

D-VG-5 Vegetation constantly changes through management activities and through naturally occurring disturbances and ecosystem recovery processes such as wind, fire, flooding, insects, disease, and vegetation succession. These fluctuations are within an ecologically and socially acceptable range of variability.

D-VG-6 Vegetation conditions that have been degraded or greatly diminished in quality or extent on the landscape by past land use are restored to conditions more representative of native vegetation communities.

O-VG-1 through 18. (See Forest Plan, pgs. 2-22,2-23)

**Background:**

Landscape Ecosystems (LEs) are the land and vegetation systems that occur naturally on the landscape. LEs are ecological areas derived from a combination of individual or groupings of native plant communities, ecological systems, and Terrestrial Ecological Unit Inventories at the Landtype and Ecological Landtype scales. Each LE is characterized by its dominant vegetation communities and patterns, which are a product of local climate, glacial topography, dominant soils, and natural processes, such as succession, fire, wind, insects, and disease. The LEs of the Chippewa National Forest nest into the Minnesota Drift and Lake Plains Section of the National Ecological Hierarchy.

The 2004 Forest Plan sets Desired Conditions, Goals and Objectives for vegetation at the Forest-wide and at the Landscape Ecosystem scale for the eight LEs described on the Forest.

**Monitoring Activities:**

***Changes to Composition and Age Class 2003***

The existing condition described in the Forest Plan for each LE was based on data updated in 2003. Changes in age class between existing condition in the Forest Plan (2003) and current condition (2006) are the result of a combination stand re-delineation, ongoing inventory, active forest management, and natural aging and disturbance.

***Stand re-delineation***

A portion of the change in age class can be attributed to stand re-delineation and data base updates. The recent stand delineation efforts use aerial photography which allows finer scale mapping with greater coordinate accuracy than were previously available. This accounts for some of the shifts in the age class distribution. For instance an older pine inclusion may have been reserved in a previous regeneration harvest. After harvest, the age of the entire stand, including the older area of pine was set back to 0. Today this inclusion may be mapped separately and assigned an age of its own. While these are small areas individually, collectively these acres now contribute to the older age classes and have been subtracted from the younger age class totals. Similarly, the delineation identified data errors such as areas of recent harvest that were not reflected in the data base and these corrections were made, increasing the younger

age class. Five thousand acres that had previously been mapped as forested are now mapped as open or non-forested. This is largely the result of mapping open and wetland inclusions as separate units rather than as components of stands. Stand re-delineation has been completed on approximately three quarters of the Forest. The remaining work should be completed in 2007.

#### *Stand inventory*

Since 2003, we have conducted Common Stand Exam (forest inventory) on approximately 93,000 acres. As each stand is inventoried, the forest type and year of origin is adjusted in the Corporate Data System (CDS) database, if necessary. The Common Stand Exam data is stored in FS Veg, the most recent national database for vegetation data. The CDS database will be replaced by FS Veg in the near future.

#### *Active Forest Management*

Regeneration harvests occurring from 2003 to the present reset stand ages to 0 and add to the 0 – 9 year age class. Harvest other than regeneration such as thinning or partial cutting does not typically affect age class distributions. At this point in Forest Plan implementation, the changes in composition from active management are fairly small.

#### *Natural aging and disturbance*

Lastly, all stands not harvested through a regeneration harvest since 2003 have aged three years since Forest Plan revision. Natural disturbance has played little role in age class distributions since 2003.

In summary, the composition numbers will continue to shift until the stand re-delineation effort is complete. Emphasis on forest inventory will continue, and the database will be updated with the new, more accurate information. Shifts in composition and age class are more likely to result from the stand re-delineation than from ongoing inventory.

### **Evaluation and Conclusions:**

The following tables and analysis are derived from the Forest GIS Stands Layer based on what has been accomplished through FY 2006. (Activities planned but not yet accomplished are not included.) The tables and graphs contain summarized forest-wide data that incorporates information on all the LEs.

#### **Forest Composition**

The following table displays the changes in forest types since 2003 in the uplands. The forest type is determined by the tree species with the greatest plurality. For example, if 51% of the stand is jack pine and 49% red pine, the forest type would be designated as jack pine. In addition, it takes time to “accumulate” enough acres to result in a shift of a percentage point. Many acres have changed in composition due to succession, harvesting, and/or planting and natural regeneration that are not yet reflected in the numbers below. In addition, the emphasis the forest has placed on increasing within stand composition diversity is not reflected in this table because the addition of a couple of hundred conifers per acre, for example white pine, would not result in a change in forest type.

**Table 17:** Forest-wide Vegetation Composition Objectives for Uplands

Forest Types	Objectives			
	Existing 2003 Forest Plan	Decade 1	Decade 2	Existing FY 2006
Jack Pine	3%	5%	6%	3%
Red Pine	16%	17%	17%	17%
White Pine	1%	2%	3%	1%
Spruce-fir	6%	6%	8%	6%
Oak	2%	2%	2%	2%
Northern Hardwoods	13%	15%	16%	15%
Aspen	50%	45%	42%	49%
Paper Birch	8%	8%	7%	8%
<b>Total</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

\*A shift of an entire percentage point represents a shift of greater than 4,500 acres. On the ground changes may have occurred that are not yet reflected by a percent change at the forest-wide level. More detailed data is available by LE. Lowland forest type objectives do not change from existing.

- We are meeting the Decade 1 composition objectives for red pine, spruce-fir, oak, northern hardwoods and paper birch.
- We have made progress toward the objectives for reducing aspen.
- We have not made progress toward increasing jack pine and white pine.

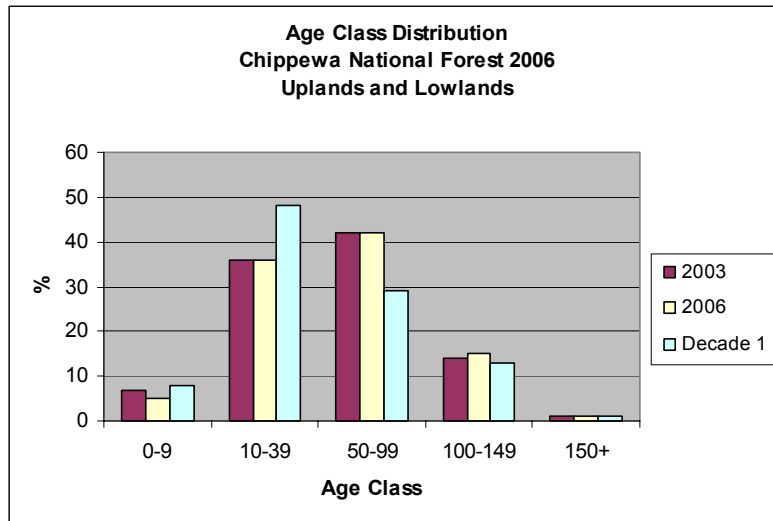
### Age Class

**Table18:** Forest-wide Age Class Objectives – Uplands and Lowlands Combined

Age Class	Objectives		
	Existing 2003 Forest Plan	Decade 1 - Objectives	Existing 2006
0-9	7%	8%	5%
10-49	36%	48%	36%
50-99	42%	29%	42%
100-149	14%	13%	15%
150+	1%	1%	1%
<b>Totals</b>	<b>100%</b>	<b>100</b>	<b>100%</b>

\*A shift of an entire percentage point represents a shift of greater than 5,500 acres. On the ground changes may have occurred that are not yet reflected by a percent change at the forest-wide level. More detailed data is available by LE.

- We have moved away from age class objectives for the 0-9 and 100–149 year age classes.
- We have not moved toward age class objectives for the 10 - 49 year age class or 50 -99 year age class, though that requires mainly time rather than active management.
- We are meeting Decade 1 age class objectives for the 150+ age class.



**Figure 6: Age Class Distributions – FY 2006**

**Recommendations:**

The Forest should continue to look for opportunities for reducing aspen and opportunities for increasing white pine and jack pine at appropriate sites and in the appropriate LEs.

Opportunities for increasing the 0-9 age class should focus mainly on the regeneration of middle age classes (50-99 and 100-149 year), but this varies by LE.

## 13. Wildlife

**Monitoring Question:**

To what extent is Forest management providing ecological conditions to maintain viable populations of native and desired non-native species.

**Monitoring Driver—Desired Condition and Objectives:**

36 CFR 219.19: “Fish and wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native vertebrate species in the planning area.”

“For planning purposes, a viable population shall be regarded as one which has the estimated numbers and distribution of reproductive individuals to insure its continued existence is well distributed in the planning area. In order to insure that viable populations will be maintained habitat must be provided to support at least a minimum number of reproductive individuals and that habitat must be well distributed so that those individuals can interact with others in the planning area.”

D-WL-3 Aquatic and terrestrial wildlife habitats and species populations, while constantly changing due to both management activities and naturally occurring events, are present in amounts, quality, distributions, and patterns so that NFS land:

- b. Maintain viable populations for all existing native and desired non-native species. Viable populations are those with the estimated numbers and distributions of reproductive individuals to insure their continued existence is well distributed within their range in the planning area.

O-WL-1 Populations: Provide ecological conditions to sustain viable populations of native and desired non-native species and to achieve objectives for management indicator species and management indicator habitats.

O-WL-2 Habitats: Move terrestrial and aquatic habitats in the direction of desired conditions and objectives for all native and desired non-native wildlife.

**Background:**

This resource area monitors and evaluates habitat trends of designated Management Indicator Habitats (MIH). Management Indicator Species (MIS) were also identified for the Chippewa National Forest (CNF) and along with MIH provide the basis for addressing requirements to maintain viability in the planning area for all native and desired non-native species. They will be used to analyze the potential effects of on-going management practices to wildlife habitats and populations during the implementation of the 2004 CNF Land and Resource Management Plan (Forest Plan). The monitoring and evaluation of the CNF's wildlife MIS (gray wolf, bald eagle and northern goshawk) was completed in 2005 and is part of the CNF's FY 2005 Monitoring and Evaluation Report. This resource report focuses on the terrestrial forested MIHs (MIH 1-9) and their progress towards meeting CNF Forest Plan objectives for habitats. MIHs are monitored to address the degree to which the Forest Plan implements MIH objectives. Associated species will be monitored to validate assumptions and predictions about population and habitat links; and to evaluate the effectiveness of the coarse filter strategy described in the Forest Plan. The monitoring and evaluation of MIHs to answer this monitoring question is a new concept that was not used during implementation of the 1986 Forest Plan.

Estimates of the range of natural variability (RNV) in the composition, structure, and processes that were established by natural disturbance patterns prior to extensive human alteration of the landscape provide reference conditions that may in fact define the "coarse filter conditions" within which the current biota evolved. The coarse filter strategy applies to the larger landscape and focuses on maintaining the full range of habitats and conditions that inherently occurred on the landscape. The conservation and restoration of diverse ecosystems and landscapes will maintain habitats for the vast majority of species and thus improve the possibilities of conserving biological diversity at all levels (Hunter et al. 1988, Hunter et al. 1999). It is not the goal of the Forest Plan for vegetation conditions to fall within RNV. However, the information derived from a better understanding of RNV conditions provides a more complete context for analyzing and evaluating the effectiveness of the coarse filter strategy for maintaining viable populations of a majority of the species present on the CNF landscapes.

MIHs were identified to provide a simplified, practical and reasonable approach to monitoring a broad spectrum of species at the landscape level. A key assumption in applying and evaluating

MIHs is that ecological conditions are likely to provide for species viability and maintain well-distributed habitats if there is an adequate representation of the range of habitats that would have been present under the range of natural variability (USDA Forest Service, Committee of Scientists 1999).

The monitoring of MIHs and the population trends of MIS and forest song birds will facilitate our evaluation the other terrestrial and aquatic species monitoring questions identified in the CNF Forest Plan. They are:

- To what extent is Forest management contributing to the conservation of sensitive species and moving toward short term (10-15 years) and long-term (100 years) objectives for their habitat conditions?
- To what extent is Forest management moving toward short term (10-15 years) and long-term (100 years) objectives for habitat conditions for management indicator species and species associated with management indicator habitats?
- To what extent is Forest management contributing to the conservation of threatened and endangered species and moving toward short term (10-15 years) and long-term (100 years) objectives for their habitat conditions and population trends?

The evaluation of these monitoring questions will occur in future monitoring and evaluation reports. This will need to occur several years into the implementation of the Forest Plan to allow population trends to be apparent under the terrestrial and aquatic conditions projected under the revised plan.

Forest Plan direction for MIH 1-9 (CNF LRMP page 2-32):

Definitions of management indicator habitats (MIH) are in Appendix C of the Forest Plan. The species most closely associated with MIHs (as identified during Forest Plan revision) are found in the Final EIS, Appendix D.

**Table 19.** Management Indicator Habitats – Description and Forest Types

Management Indicator Habitat	Description and Forest Types
Upland forest	All upland forest types: jack pine; red pine; white pine; balsam fir-aspen-birch; spruce-fir; black spruce-jack pine; northern hardwoods, including oak and maple; aspen; paper birch; bigtooth aspen; balsam poplar; aspen-spruce-fir.
Upland deciduous forest	All upland deciduous and deciduous-dominated mixed forest types.
Northern hardwood and oak forest	All northern hardwood and oak forest types.
Aspen-birch & mixed aspen-conifer forest	All aspen, birch, and aspen-dominated aspen-birch-conifer mixed forest types.
Upland conifer forest	All upland conifer and conifer-dominated mixed forest types.
Upland spruce-fir forest	All spruce-fir and spruce-fir-dominated mixed forest types.
Red and white pine forest	Both red and white pine forest types.
Jack pine forest	Jack pine forest type.
Lowland black spruce-tamarack forest	All lowland conifer and lowland mixed conifer types dominated by black spruce or tamarack.

Management indicator habitats are based on groupings of forest types in different age classes. The age groupings are surrogates for ecological, successional or vegetation growth stages that reflect a variety of habitat conditions and situations.

**Table 20.** MIH 1-9: Age grouping for forest types.

<b>Management Indicator Habitat 1-9: Age groupings for forest types.</b>					
<b>Forest Types and (codes)</b>	<b>Young (Seedling- open)</b>	<b>Sapling/ pole</b>	<b>Mature/ Old</b>	<b>Old/Old Growth</b>	<b>Old Growth Multi-aged</b>
Jack pine	0-9	10-39	40-59	60-79	80+
Red pine	0-9	10-49	50-119	120-149	150+
White pine	0-9	10-49	50-119	120-149	150+
Lowland black spruce-tamarack dominated conifers	0-19	20-59	60-119	120-149	150+
White cedar	0-19	20-59	60-119	120-149	150+
Spruce/fir	0-9	10-49	50-89	90-149	150+
Upland northern hardwoods	0-9	10-59	60-119	120-149	150+
Oak	0-9	10-59	60-99	100-149	150+
Lowland northern hardwoods	0-19	20-59	60-119	120-149	150+
Aspen-birch and aspen-birch- conifer	0-9	10-49	50-79	80+	80+

All MIHs are compatible with and complementary to Landscape Ecosystem objectives for vegetation composition, structure, age, tree diversity, and social objectives; and to management direction for other resources including vegetation, watershed health and other wildlife considerations. By moving toward Decade 1 and 2 objectives for these resources the CNF will move toward long-term desired conditions for desired amounts, quality and distribution of management indicator habitats and their associated species.

#### MIHs 1-9

Objectives for MIHs 1-9 are identified at the Landscape Ecosystem scale and can be found in the Landscape Ecosystem Objectives Section (CNF Forest Plan, pages 2-59 thru 2-80).

#### MIH 7: Mature and older red and white pine forest

S-WL-9 Maintain at least 40,000 acres in mature or older red and white pine forest types during the implementation period of the forest plan.

#### MIH 8: Mature and older jack pine forest

S-WL-10 Maintain at least 5,300 acres in mature or older jack pine forest types during the first 10 years of plan implementation.

The following MIHs will be monitored and evaluated in a future Monitoring and Evaluation report: MIH 10 – Upland mature riparian forest, MIH 11 – Management-induced edge density in upland and lowland forests, MIH 12 – Upland interior forest, MIH 13 – Large patches of upland

mature/old forest habitat, and MIH 14 – Aquatic habitats.

### Monitoring Activities:

Based upon the forest types and age groupings provided above, acres occurring in each of the MIHs were calculated at the end of 2006 (data source: GIS Corporate Stands Layer). These calculations were completed for each landscape ecosystem (LE) and forestwide. The acreage amount in each MIH category was then compared to the corresponding amount that occurred with the initiation of the 2004 Forest Plan to determine the current trajectory for that particular MIH.

### Landscape Ecosystem Level Monitoring:

Comparisons were made at the LE level to determine if the MIH trends were on track to meet the stated objectives for the first decade of Forest Plan implementation (CNF Forest Plan, pages 2-53 thru 2-80). The results are provided for each LE below. Bolded letters indicate where current trends are not tracking with the stated LE objective; d = decrease; m = maintain; i = increase. There are some MIHs where the current trajectory is considerably different (greater than 15%) from the first decade objective; these trends are noted in the bullets that follow each of the tables.

<b>Table 21. Dry Pine Landscape Ecosystem</b>						
Management Indicator Habitat	Young		Mature		Old/Older	
	Plan Obj.	2006 Trend	Plan Obj.	2006 Trend	Plan Obj.	2006 Trend
Upland Forest	d	d	d	i	d	d
Upland Deciduous Forest	d	d	d	i	i	i
Upland Northern Hardwood Forest	m	m	m	m	m	m
Aspen / Birch Forest	d	d	d	d	i	i
Upland Conifer Forest	d	d	i	i	m	<b>d</b>
Spruce-Fir Forest	m	m	m	m	m	m
Red and White Pine Forest	d	d	i	i	m	<b>d</b>
Jack Pine Forest	i	<b>d</b>	d	d	d	d
Lowland Black Spruce / Tamarack Forest	m	m	m	i	m	<b>d</b>

- The amount of mature upland forest has increased (22%) rather than decreased.
- The amount of old and older upland conifer, especially in the red and white pine types, has decreased (17%) rather than being maintained.
- The amount of young jack pine has decreased (30%) rather than increased.
- The amount of old and older lowland conifer has decreased (48%) rather than being maintained.

<b>Table 22. Dry-Mesic Pine Landscape Ecosystem</b>						
Management Indicator Habitat	Young		Mature		Old/Older	
	Plan Obj.	2006 Trend	Plan Obj.	2006 Trend	Plan Obj.	2006 Trend
Upland Forest	d	d	d	i/m	i	i

<b>Upland Deciduous Forest</b>	d	d	d	d/m	i	i
<b>Upland Northern Hardwood Forest</b>	d	d	d	i	i	d/m
<b>Aspen / Birch Forest</b>	d	d	d	d	i	i
<b>Upland Conifer Forest</b>	i	d	i	i	i	d
<b>Spruce-Fir Forest</b>	d	d	i	i	i	d
<b>Red and White Pine Forest</b>	i	i	i	i	i	i
<b>Jack Pine Forest</b>	d	d	d	d	i	d
<b>Lowland Black Spruce / Tamarack Forest</b>	i	d	d	m/i	i	i

- The amount of young upland conifer has decreased (15%) rather than increased.
- The amount of old and older upland conifer, especially in the spruce-fir and jack pine types, has decreased (17%) rather than increased.
- The amount of old and older jack pine has decreased (32%) rather than increased.
- The amount of young lowland conifer has decreased (64%) rather than increased.

<b>Table 23. Dry-Mesic Pine/Oak Landscape Ecosystem</b>						
<b>Management Indicator Habitat</b>	<b>Young</b>		<b>Mature</b>		<b>Old/Older</b>	
	<b>Plan Obj.</b>	<b>2006 Trend</b>	<b>Plan Obj.</b>	<b>2006 Trend</b>	<b>Plan Obj.</b>	<b>2006 Trend</b>
<b>Upland Forest</b>	d	d	d	d	i	i
<b>Upland Deciduous Forest</b>	d	d	d	d	d	i
<b>Upland Northern Hardwood Forest</b>	d	d	i	i	i	i
<b>Aspen / Birch Forest</b>	d	d	d	d	d	i
<b>Upland Conifer Forest</b>	i	d	d	d	i	i
<b>Spruce-Fir Forest</b>	d	d	m	m	i	i
<b>Red and White Pine Forest</b>	d	d	d	m/i	i	i
<b>Jack Pine Forest</b>	i	d	d	d	d	m/i
<b>Lowland Black Spruce / Tamarack Forest</b>	i	d	d	i/m	i	i

- The amount of old and older upland deciduous forest, especially in the aspen-birch type, has increased (34%) rather than decreased.
- The amount of young upland conifer has decreased (49%) rather than increased.
- The amount of young jack pine has decreased (39%) rather than increased.
- The amount of young lowland conifer has decreased (23%) rather than increased.

<b>Table 24. Boreal Hardwood/Conifer Landscape Ecosystem</b>						
<b>Management Indicator Habitat</b>	<b>Young</b>		<b>Mature</b>		<b>Old/Older</b>	
	<b>Plan Obj.</b>	<b>2006 Trend</b>	<b>Plan Obj.</b>	<b>2006 Trend</b>	<b>Plan Obj.</b>	<b>2006 Trend</b>
<b>Upland Forest</b>	d	d	d	i/m	i	i
<b>Upland Deciduous Forest</b>	d	d	d	i/m	i	i
<b>Upland Northern Hardwood Forest</b>	d	d	i	i	i	i

<b>Aspen / Birch Forest</b>	d	d	d	d	m	i
<b>Upland Conifer Forest</b>	d	d	i	d	i	i
<b>Spruce-Fir Forest</b>	d	d	m	d/m	i	i
<b>Red and White Pine Forest</b>	i	i	i	d/m	i	d
<b>Jack Pine Forest</b>	d	d	m	m	d	i
<b>Lowland Black Spruce / Tamarack Forest</b>	i	d	d	d/m	i	i

- The amount of old and older red and white pine has decreased (17%) rather than increased.
- The amount of old and older jack pine has increased (25%) rather than decreased.
- The amount of young lowland conifer has decreased (19%) rather than increased.

<b>Table 25. Mesic Northern Hardwood Landscape Ecosystem</b>						
<b>Management Indicator Habitat</b>	<b>Young</b>		<b>Mature</b>		<b>Old/Older</b>	
	<b>Plan Obj.</b>	<b>2006 Trend</b>	<b>Plan Obj.</b>	<b>2006 Trend</b>	<b>Plan Obj.</b>	<b>2006 Trend</b>
<b>Upland Forest</b>	d	d	d	d/m	i	i
<b>Upland Deciduous Forest</b>	d	d	d	dm	i	i
<b>Upland Northern Hardwood Forest</b>	d	d	i	i/m	i	i
<b>Aspen / Birch Forest</b>	d	d	d	d	i	i
<b>Upland Conifer Forest</b>	d	d	i	d/m	i	i/m
<b>Spruce-Fir Forest</b>	d	d	i	d	i	d
<b>Red and White Pine Forest</b>	d	d	i	i	m	i
<b>Jack Pine Forest</b>	m	m	m	m	m	m/i
<b>Lowland Black Spruce / Tamarack Forest</b>	i	i	d	m	i	i/m

- The amount of old and older upland spruce-fir has decreased (27%) rather increased.

<b>Table 26. White Cedar Swamp Landscape Ecosystem</b>						
<b>Management Indicator Habitat</b>	<b>Young</b>		<b>Mature</b>		<b>Old/Older</b>	
	<b>Plan Obj.</b>	<b>2006 Trend</b>	<b>Plan Obj.</b>	<b>2006 Trend</b>	<b>Plan Obj.</b>	<b>2006 Trend</b>
<b>Upland Forest</b>	d	d	d	d/m	i	i
<b>Upland Deciduous Forest</b>	d	d	d	d/m	i	i
<b>Upland Northern Hardwood Forest</b>	m	m	m	m/i	m	m/i
<b>Aspen / Birch Forest</b>	d	d	d	d/m	i	i
<b>Upland Conifer Forest</b>	m	m	d	d	m	m/i
<b>Spruce-Fir Forest</b>	m	m	d	d	m	m/i
<b>Red and White Pine Forest</b>	m	m	m	m/i	m	m
<b>Jack Pine Forest</b>	m	m	m	m	m	m

<b>Lowland Black Spruce / Tamarack Forest</b>	m	m/i	d	i	i	d
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<b>Table 27. Tamarack Swamp Landscape Ecosystem</b>						
<b>Management Indicator Habitat</b>	<b>Young</b>		<b>Mature</b>		<b>Old/Older</b>	
	<b>Plan Obj.</b>	<b>2006 Trend</b>	<b>Plan Obj.</b>	<b>2006 Trend</b>	<b>Plan Obj.</b>	<b>2006 Trend</b>
<b>Upland Forest</b>	d	d	d	i	i	i
<b>Upland Deciduous Forest</b>	d	d	d	i	i	i
<b>Upland Northern Hardwood Forest</b>	d	d	i	i	i	i
<b>Aspen / Birch Forest</b>	d	d	d	d/m	i	i
<b>Upland Conifer Forest</b>	i	d	m	i	i	i
<b>Spruce-Fir Forest</b>	d	i	d	d	i	i
<b>Red and White Pine Forest</b>	m	d	i	i	i	i
<b>Jack Pine Forest</b>	d	d	m	m	m	i
<b>Lowland Black Spruce / Tamarack Forest</b>	i	d	d	d	i	i

- The amount of young upland conifer has decreased (17%) rather than increased.
- The amount of mature upland conifer has increased (17%) rather than being maintained.
- The amount of young red and white pine has decreased (92%) rather than being maintained.
- The amount of young lowland conifer has decreased (37%) rather than increased.

### **Chippewa National Forest Monitoring:**

Through a partnership with the University of Minnesota - Duluth, the Natural Resources Research Institute (NRRI) has conducted breeding bird monitoring on the Chippewa National Forest since 1991. This monitoring program was designed to provide an accurate estimate of population change for forest bird species on three national forests in northern Minnesota and Wisconsin. Point count sampling used in this program follow national and regional standards (Ralph et al. 1993, 1995, Howe et al. 1997). Ten-minute point counts were conducted at each point between June and early July (Reynolds et al. 1980). Point counts are appropriate for determining the relative abundance of most singing passerine species, but are inadequate for waterfowl, grouse, woodpeckers, and most raptors. Point counts were conducted by trained observers from approximately 0.5 hour before to 4 hours after sunrise on days with little wind (< 15 km/hr) and little or no precipitation. All birds heard or seen from the point were recorded with estimates of their distance from that point. Based on the 15 years of data collected, statistical models are used to analyze and detect relative abundance, population trajectory and population trends for forest-dwelling birds on the CNF. Of the 57 species tested in the CNF in 2006, 14 species (25%) increased significantly and 13 (23%) decreased. The 2006 annual update report, as well as annual update reports from 1998 to 2005, can be found on the internet at: <http://www.nrri.umn.edu/mnbirds/reports.htm>. Bird population trends can be useful in evaluating changes to habitat quantity and quality over time. The population trends for forest-dwelling birds associated with particular habitats can provide some insights into the effectiveness of the coarse filter strategy.

At the forestwide scale, the acres were totaled for each MIH and evaluated in terms of their relationship to the high and low ends of the range of natural variability (RNV) for that forest type and age grouping (CNF FEIS, Appendix D, page D-10). This information provides some perspective and context for evaluating current forest conditions relative to coarse filter management. The table provided below displays the acreage amounts for when the current Forest Plan was initiated and at the end of 2006 and the low and high ends of RNV for the amount of young and the mature and older by MIH.

**Table 28.** Acres of MIH in FY 2004 and FY 2006 compared to RNV.

Management Indicator Habitat	Young 2004	Young 2006	Estimated low end of RNV	Estimated high end of RNV	Mature & Older 2004	Mature & Older 2006	Estimated low end of RNV	Estimated high end of RNV
Upland Forest	51900	28200	18200	32900	217000	226600	300100	350300
Upland Deciduous Forest	40600	22000	10700	13100	156400	164700	142900	162400
Upland Northern Hardwood Forest	1500	800	0	800	55000	59300	133000	141100
Aspen / Birch Forest	38600	20800	10700	11800	92900	96600	unknown	19900
Upland Conifer Forest	11100	6300	7500	19800	60500	61900	157200	187900
Spruce-Fir Forest	2500	1200	400	3400	12000	11800	67700	78200
Red and White Pine Forest	3800	2000	2000	9400	40800	43200	79400	99000
Jack Pine Forest	5100	3100	5100	7000	7700	6900	10200	10800
Lowland Black Spruce / Tamarack Forest	2000	1500	4500	6200	54900	57000	49800	53000

### Upland Deciduous Forest

#### Young:

- ✓ The amount of young upland deciduous forest has decreased substantially since 2004. However, it continues to be nearly double the amount that was expected to occur under RNV.

#### Mature and Older:

- ✓ The amount of mature and older upland deciduous forest has increased somewhat since 2004. The acreage amounts in this MIH are slightly above the upper end of what was expected to occur under RNV.

## **Upland Coniferous Forest**

### Young:

- ✓ The current amounts of young upland conifer are below those expected to have occurred for this MIH under RNV. This has occurred since 2004 and to all forest types in this category.

### Mature and Older:

- ✓ The current amounts of mature and older upland conifer are substantially below those expected to have occurred for this MIH under RNV. This is true for all forest types in this category.

## **Lowland Black Spruce/Tamarack Forest**

### Young:

- ✓ The current amounts of young lowland conifer are considerably below those expected to have occurred for this MIH under RNV.

### Mature and Older:

- ✓ The current amounts of mature and older lowland conifer have increased slightly and remain above those expected to have occurred for this MIH under RNV.

## **Evaluation and Conclusions:**

### LANDSCAPE ECOSYSTEM LEVEL:

In general, a large majority of the MIHs in all LEs are moving in the direction of the stated objective. As noted above, there are some MIHs where the current trajectory is considerably different (greater than 15%) from the first decade objective. However, the trends displayed above are after only two years of Forest Plan implementation. Depending on the landscape ecosystem and forest types undergoing regeneration in the future, some of these trends can change fairly quickly. MIH trends will continue to be monitored in the future to track the accomplishment of Forest Plan objectives for forest wildlife habitat. MIH amounts and trends will also be used at the vegetation management project level to inform decisions on regeneration activities.

### CHIPPEWA NATIONAL FOREST LEVEL:

This portion of the evaluation looks at the current forest conditions in relation to RNV. This is done to assess the trends for implementation of the forestwide coarse filter for species viability. Again, it is difficult to evaluate the trends after only two years of Forest Plan implementation to draw any meaningful conclusions from the data at this point.

In FY 2007, the CNF will be working with the NRRI staff and forest bird monitoring data to select a suite of species that are most closely associated with a particular MIH and whose population trends may indicate the availability and quality of these habitats. Relevant NRRI forest bird monitoring data will be incorporated into future CNF Monitoring and Evaluation reports to provide potential insights into the effectiveness of this management approach. There are many complicating factors (nest predation, changes on wintering grounds, difficulties during migration, etc.) that individually or in combination may have an effect on populations of forest birds breeding on the CNF. However, population trends of individual species or guilds of

species may provide insights into forest habitat conditions that may be affected by CNF management activities.

**Recommendations:**

- Continue to monitor MIH amounts and trends every two years.
- Continue to utilize MIH amounts and trends to inform proposed management activities.
- Continue to partner with NRRI to monitor forest bird population trends and their associations with MIHs.
- Consider evaluation of MIS, sensitive species, threatened and endangered species and selected forest song birds within the context of MIH trends after 4-5 years of Forest Plan implementation.

**Literature cited:**

- Howe, R. W., G. J. Niemi, G. J. Lewis, and D. A. Welsh. 1997. A standard method for monitoring songbird populations in the Great Lakes region. *Passenger Pigeon* 59:182-194.
- Hunter, Malcolm L. Jr., George L. Jacobson, Jr., and Thompson Webb, III. 1988. Paleoecology and the Coarse-Filter Approach to Maintaining Biological Diversity. *Conservation Biology*, Vol. 2, No. 4. Pp. 375-385.
- Hunter, Malcolm L., Jr., editor. 1999. *Maintaining Biodiversity in Forest Ecosystems*. Cambridge University Press, Cambridge, UK. 698 p.
- Lind, J., M. Etterson, N. Danz, J. M. Hanowski, and G. J. Niemi. 2006. Breeding bird monitoring in Great Lakes National Forests: 1991-2005. Natural Resources Research Institute Technical Report: NRRI/TR-2005/04. (available at <http://www.nrri.umn.edu/mnbirds/reports.htm>)
- Ralph, C. J., G. R. Geupel, P. Pyle, T. E. Martin, and D. F. DeSante. 1993. Handbook of field methods for monitoring landbirds. Gen. Tech. Rep. PSW-GTR-144. Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture, Albany, CA. 41 pp.
- Ralph, C. J., J. R. Sauer, and S. Droege (eds.). 1995. Monitoring bird populations by point counts. Gen. Tech. Rep. PSW-GTR-149. Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture, Albany, CA. 181 pp.
- Reynolds, R. T., J. M. Scott, and R. A. Nussbaum. 1980. A variable circular-plot method for estimating bird numbers. *Condor* 82:309-313.
- US Department of Agriculture, Committee of Scientists. 1999. *Sustaining the People's Lands: Recommendations for Stewardship of the National Forests and Grasslands into the Next Century*. Washington, DC, US Department of Agriculture. 193 p.

## **14. Wildlife: Non-native Invasive Species**

**Monitoring Question:**

To what extent is Forest management contributing or responding to populations of terrestrial or aquatic non-native species that threaten native ecosystems?

**Monitoring Driver—Desired Condition and Objectives:**

D-WL-9: Native plants and animals dominate all terrestrial and aquatic ecosystems, with non-native plants and animals forming, at most, a minor component.

O-WL-38 Reduce the spread of terrestrial or aquatic non-native invasive species that pose a risk to native ecosystems.

O-WL-39 Use Integrated Pest Management to:

- a. Eradicate any populations of new invaders
- b. Contain or eradicate populations of recent invaders (*i.e.*, non-native invasive species that have only recently become established but are not widespread in the planning area)
- c. Limit the spread of widespread, established invaders within the planning area

Monitoring was conducted for two species—rusty crayfish and earthworms.

## **Rusty Crayfish**

### **Background:**

Crayfish are an important component of aquatic ecosystems, sometimes functioning as “ecosystem engineers” by altering aquatic plant structure and density in lakes or streams, and therefore changing habitat for other species. Some non-native crayfish species have been found to severely damage aquatic plant communities, particularly where they become extremely abundant. One of these non-native species, rusty crayfish (*Orconectes rusticus*), was first discovered in Minnesota around 1960. It is native to the Ohio River basin, but has now spread to several states outside of that area. Although some regulations are in place to prevent the spread of rusty crayfish, this species may still be transported easily between water bodies through bait-buckets. An effective way to prevent this introduction is by public education.

It is unclear to what extent rusty crayfish are distributed in Forest lakes, and what potential impacts have occurred with their introduction. In order to understand the distribution of crayfish species across the Forest, lakes and streams were sampled in cooperation with the Cass Lake Area Learning Center (CLALC). The CLALC has been surveying Forest lakes for crayfish since 2001. Results of the crayfish surveys were presented to the public at the Norway Beach Visitor Information Center, near Cass Lake. Data collected from the 2006 survey were added to existing baseline data to monitor the distribution of crayfish, including *O. rusticus*, across the Forest. Data is currently in a local access database but will be added to the corporate NRIS Water module hopefully soon. It is mostly presence/absence data, by location and includes species and sex of the individuals. Thus far, surveys have been collected annually since 2001 (except for 2004).

### **Monitoring Activities:**

Crayfish were sampled using a variety of techniques that included setting baited, modified minnow traps, and by spotting crayfish in shallow water and capturing them with dip nets. Staff and students from the CLALC performed all of the surveys, including voucher specimen

identification. Sites were selected to sample a variety of lakes and habitat types and to determine whether rusty crayfish have spread from Cass Lake to other connected tributaries or lakes connected by tributaries. The entrance of minnow traps (made from ¼ inch screen) was enlarged and flattened slightly to a width of 5 cm, which has been suggested to adequately sample all sizes of crayfish. Traps were set for between 20 and 27 hours, and were baited with dead suckers. All crayfish captured were measured, sexed, and identified to species.

### **Evaluation and Conclusions:**

Twenty-eight locations on 10 lakes were surveyed between June 26 and 29, 2006, and 17 rusty crayfish were collected at four of those locations. Three of the rusty crayfish collections were made in Cass Lake (East & West Potato Islands and Star Island Point), while the fourth location, Kabekona Narrows, is in Leech Lake. Rusty crayfish had not previously been collected from the Potato Islands or Star Island, even though these locations had been surveyed in prior years. However, rusty crayfish had been collected at other areas in Cass Lake in previous years. CLALC had also previously collected rusty crayfish at the Kabekona location on Leech Lake.



Rusty crayfish most likely entered Cass Lake and Leech Lake through anthropogenic vectors, such as the live bait trade, and because these lakes are connected to other lakes and rivers, it is likely that the species will eventually move into additional lakes. The Chippewa National Forest will continue to monitor the spread of rusty crayfish, through partnerships such as the one with CLALC. Data gathered during monitoring will be used to help inform the public of the spread of these non-native invaders to other waterbodies and their threat to native species. Non-native invasive species have been identified as one of the top four threats to National Forest land. Because they lack pathogens and predators, some invasives have become persistent, aggressive invaders of disturbed habitats and native plant communities. They may become the dominant disturbance component, thus reducing native plant diversity, threatening sensitive species and impacting wildlife habitat.

## **Earthworms**

### **Background:**

The effects of invasive earthworms on forest ecosystems in the northern United States are becoming an important topic for natural resource agencies.

There is no evidence that earthworms ever inhabited Minnesota before European settlement. Even if they did, the glaciers killed any native North American earthworms in our region. For the last 11,000 years since the glaciers receded, Minnesota ecosystems developed without earthworms. There are over 100 species of native North American earthworms in unglaciated areas such as the southeastern U.S. and the Pacific Northwest. However, native

species have either been too slow to move northwards on their own or they are not able to survive Minnesota's harsh climate.

All earthworms' species in Minnesota are exotic invasive species. The first earthworms probably arrived with soils and plants brought from Europe. During the late 1800's and early 1900's many European settlers imported European plants that likely had earthworms or earthworm cocoons (egg cases) in their soils. More recently, the widespread use of earthworms as fishing bait has spread them to more remote areas of the state. All common bait worms are non-native species, including those sold as "night crawlers", "Canadian crawlers", "leaf worms", or "angle worms". This reintroduction of invasive earthworms into Minnesota has occurred over a wide geographic area (Alban and Berry, 1994).

Minnesota's hardwood forests developed in the absence of earthworms. Without worms, fallen leaves decompose slowly, creating a spongy layer of organic "duff". This duff layer is the natural growing environment for a variety of herbs and tree seedlings. It also provides habitat for ground-dwelling animals and helps prevent soil erosion. Invading earthworms eat the leaves that create the duff layer and where heavy infestations occur are capable of eliminating it completely. Many young seedlings perish, along with some ferns and wildflowers. The severity of impact depends on the earthworm species present. In areas heavily infested by earthworms, soil erosion and leaching of nutrients may reduce the productivity of forests.

Some earthworm infestations on the Chippewa National Forest have produced changes in the soil, as well as changes in the species composition and the understory flora and fauna of the forest. Because earthworms occupy and act within the important interface between the aboveground portion and below ground portion, they are important.

Recently, earthworms and other exotic invasive species have received an assist by the existing road network and off highway recreation use. According to researchers, earthworm populations may spread by three primary mechanisms:

- 1). Construction of our extensive road system, by placing infested fill material on the roads and shoulders and further moving this material by human traffic patterns.
- 2). Discarding unused bait materials near fishing locations.
- 3). Relocation of infested fill or horticultural materials.

Since the 1990's, there has been an increase in worm awareness and research across the nation. Studies have been conducted by the University of Minnesota, the Natural Resources Research Institute (NRRI), citizens as well as other universities and agencies. Refer to <http://www.nrri.umn.edu/worms/> for more information.

### **Monitoring Activities:**

The Chippewa National Forest has made an effort to monitor for exotic earthworms. In FY2005, exotic earthworm criteria were added to the Threatened, Endangered, or Sensitive plant (TES) surveys which are conducted in stands with the potential for management activities such as timber harvest, prescribed burning or other management activities. Surveys in hardwood stands noted one of three choices for earthworms: 1). Not Impacted, 2). Impacted or 3).

Severely Impacted. Observers also noted duff depth and apparent physical characteristics of the soil.

From the site locations and information collected, a GIS map coverage was created. A local Microsoft Access database contains information on each site surveyed. Each individual record can be printed individually and used for revisits to the site. This information is available to resource managers.

### **Evaluation and Conclusions:**

At this time, the full extent of earthworm invasion on the Forest is unknown. Combining earthworm observations with the sensitive plant surveys that are already being conducted is a cost effective way to begin assessing the problem. It appears that there few areas on the Forest severely impacted by earthworms. Although there are some moderately impacted sites, there appear to be some sites that are not impacted by earthworms. The Forest objective is to prevent or minimize earthworm introductions to areas currently not impacted. The Forest Management implications are uncertain but as the problem is highlighted, research will provide a better ecological understanding of the impacts and effects on the hardwood ecosystems in particular.

### **Recommendations:**

1. Continue programs to educate public on earthworms and discourage disposal of bait by tossing contents in woods or along lakes.
2. Develop mitigation measures to be applied during harvest or other management activities to minimize the spread of earthworms and egg masses.
3. Continue to assess and update the inventory process.
4. Devise simple data collection methods to determine the ecological context of each plant community (stand) relative to exotic earthworms. Minnesota Worm Watch has methodologies for invasive earthworm surveys that may be helpful.
5. Earthworms are present in many of the forested cover types on the Chippewa, not simply in hardwood stands. Although wetlands do represent a barrier that has prevented some earthworm migration locally, these relationships are poorly understood and should be clarified.
6. Promote familiarity with information in “Ecological Implications of Exotic Earthworm Invasions in Forests” by the University of Minnesota by agency personnel and the public.

### **Literature Cited:**

Alban DH, Berry E. 1994. Effects of earthworm invasion on morphology, carbon, and nitrogen of a forest soil. *Appl Soil Ecol* 1:246–9.

Bohlen, P. J., S. Scheu, C. M. Hale, M. A. McLean, S. Migge, P. M. Groffman and D. Parkinson. 2004. Invasive earthworms as agents of change in north temperate forests. *Frontiers in Ecology and the Environment* 2: 427-435 (pdf).

Hendrix PF, Bohlen PJ (2002) Exotic earthworm invasions in North America: Ecological and policy implications. *BioScience* 52:801–811.

## **15. Water**

### **Monitoring Question:**

To what extent is Forest management affecting water quality, quantity, flow timing and the physical features of aquatic, riparian, or wetland ecosystems?

### **Monitoring Driver—Desired Condition and Objectives:**

D-WS-1 Watersheds and their components:

- Are part of healthy ecosystems that meet the needs of current and future generations
- Provide for State, tribal, and local beneficial uses
- Are protected or enhanced to provide for unique plant and animal communities, special habitat features, habitat linkages, wildlife corridors, aquatic ecosystems and riparian ecosystems.

D-WS-2 Water-related recreational, subsistence and commercial uses (such as access for powered or non-powered watercraft; opportunities and access for activities such as fishing, swimming, camping, wild rice harvesting, and aesthetics) are provided for within the limits of aquatic ecosystem capability.

D-WS-3 Watersheds and soils are maintained or restored in a way that allows for the conservation of the genetic integrity of native species. Physical properties of soils are maintained and enhanced. Watershed and habitat restoration projects are natural appearing and favor the use of native materials or naturalized species to the extent practical.

D-WS-4 Management activities do not reduce existing quality of surface or groundwater or impair designated uses of surface and groundwater.

D-WS-5 Water quality, altered stream flow, and channel stability do not limit aquatic biota or associated recreational uses. Water in lakes, streams, and wetlands meets or exceeds State water quality requirements.

D-WS-6 Watersheds provide an appropriate quantity, quality, and timing of water flow. Stream channels and lakeshores are stable. Stream temperatures are maintained within their natural range and are not increased by lack of shading or because of channel instability. Stream channels, including those in wetlands, are able to transport water and sediment without changing their pattern, dimension, and profile. Sensitive stream types are protected and improved. Management activities protect or promote quality of habitats that occur in the riffle areas of streams, improving stable channel characteristics.

D-WS-7 The physical integrity and hydrologic connectivity of pool depressions in seasonal ponds is maintained to assure seasonal retention of water.

D-WS-8 Hydrologic connectivity of aquatic ecosystems and wetlands is maintained or restored to assure passage of water, sediment, nutrients, wood, invertebrates, and fish and to facilitate freshwater mussel dispersal. The number of impoundments is minimized. Waters affected by dams are managed as much as practical to mimic natural lake levels and seasonal flows. Stream flows and lake levels on waters not affected by dams are suitable to protect habitat and maintain natural hydrologic processes.

D-WS-9 Fine sediment from management activities does not adversely affect lake, stream, and wetland habitats. Macro-invertebrates are represented in the approximate proportion expected for high quality waters. Fish habitats are in good to excellent condition and are spatially distributed and connected to allow stable populations of fish, reptiles, and amphibians to persist within their natural ranges. Natural reproduction of fish is not limited by habitat condition.

D-WS-10 Riparian areas serve as landscape connectors. Riparian areas, habitats, and associated vegetative communities are diverse in composition and structure and support native and desired non-native wildlife and plant species appropriate to site, soil, and hydrologic characteristics. Plants are present at a variety of ages and sizes and at densities adequate to provide bank stability. Where suitable to the site, a multi-layered forest canopy is present in the riparian area, providing shade, leaf-litter, and coarse woody debris to lakes, streams, and wetlands. Some of these sites have an overstory of conifer that provides shade for aquatic and wetland ecosystems and thermal cover for wildlife. Super canopy trees provide nest sites for riparian associated species. Openings in riparian area vegetation resulting from road crossings, trails, campsites, water access, or other recreational uses, occur infrequently and result in minimal alterations of riparian ecological function.

D-WS-11 Riparian ecosystems filter runoff. Some of the mature and decadent trees from riparian ecosystems have fallen into lakes, streams, and wetlands, providing bank stability and habitat complexity. Other mature and decadent trees are retained in the riparian ecosystem, providing habitat for amphibians and other species and a reservoir of large wood to supply aquatic and wetland systems.

D-WS-12 Soils recover from natural disturbance events and absorb the effects of human disturbances without reducing productivity and function. Soils contribute to ecosystem sustainability. Soil-hydrologic function and productivity is protected, preserving the ability to serve as a filter for good water quality and regulation of nutrient cycling. Soil exposure is minimized. There is minimal compaction, displacement, and puddling. Severely burned conditions resulting from management-ignited fire occur infrequently.

O-WS-1 Improve and protect watershed conditions to provide the water quality, water quantity, and the soil productivity necessary to support ecological functions and intended beneficial water uses.

O-WS-2 Restore ecological integrity on all or parts of one or two of the Forest's fifth level watersheds per year by:

- Enhancing or re-establishing the natural ecological process and diversity of riparian areas (aquatic ecosystems, riparian ecosystems, and wetlands) on National Forest System land.
- Improving road and trail crossings of streams and wetlands to assure soil stability, unimpeded flow, sediment transport, and/or passage of fish.
- Characterizing the ecological composition, structure function, and patterns of individual lakes, streams, wetlands, upland and lowland soil (terrestrial ecological classification units) and the watersheds and landscapes in which they are nested.

O-WS-9 Protect and restore areas where soils are adversely impaired and contributing to an overall decline in watershed condition, soil productivity, soil quality and soil function. Do this by using management practices, inventory and monitoring results, and findings from the inventory of ecological units.

O-WS-10 During all management actions involving soil disturbance:

- Maintain adequate ground cover and soil organic layers, both during and after treatment, to minimize erosion (including rill and gully formation) and allow water to infiltrate the soil.
- Minimize soil displacement, nutrient loss, and effects of severe burning.
- Restore and re-vegetate disturbed areas.
- Provide for the maintenance of physical, chemical and biological properties of the forest floor (soil organic matter, surface O layer) that make soil productive.
- Protect soil-hydrologic functions by minimizing rutting, puddling, and compaction.
- At the project level, this objective does not apply to the portions of disturbed areas that, by design, are converted long term or permanently to a non-productive condition (such as gravel pits or the actual compacted or paved surfaces of all season roads or trails, parking lots, or water access ramps).

O-RWA-1 Associated recreational, subsistence, and commercial water uses at water access sites will enhance or maintain water quality, TES species, and viable populations of native species and desirable non-native species.

D-PH-3 Hazardous materials:

- a. Soil, water, and air resources on the Forest are not contaminated with hazardous materials.
- b. Known sites of hazardous materials are managed and mitigated so that public health and natural resources are not negatively affected.
- c. Hazardous material events are coordinated smoothly with other agencies involved in the situation and Forest interests are represented.
- d. Stored hazardous materials pose the smallest possible threat to personnel and the environment.

D-PH-4 Water Supplies and Wastewater Treatments:

- a. Federal sewage disposal and other developments do not adversely affect water resources.
- b. Public and non-public water supplies are safe for use.

O-PH-3 Known abandoned wells will be grouted and unused wells will be capped and maintained to prevent groundwater contamination.

O-TS-4 Road and trail crossings of streams, wetlands, and riparian areas adjacent to lakes and streams will be minimized.

O-TS-5 Hydrologic and riparian functions will be maintained or improved when roads or trails are constructed across wetlands.

**Background:**

Forest Plan direction calls for maintenance, enhancement, and restoration of watershed conditions. Forest management activities can potentially affect watershed conditions in a number of ways. Activities designed to improve conditions are carried out by multiple programs and with various partners. Actions not directly tied to watershed improvements are carried out in such a way that, at a minimum, maintains watershed conditions. This is largely done by following Best Management Practices (BMPs) in the Forest Plan and the Minnesota Forest Resource Council Voluntary Site-Level Forest Management Guidelines (MFRC Gold Book). Monitoring actions undertaken in 2006 address watershed improvement projects, forest lake water quality, and BMPs related to vegetation management. Drinking water, swimming beach and sewer plant water quality testing also occurred and are discussed in the Public Health section.

In FY 2006 watershed conditions were improved by decommissioning over five miles of system and non-system road. One of these road segments restored the hydrologic regime on an estimated 20 acre wetland basin. Three groundwater wells were decommissioned and sealed and one surface water impoundment was decommissioned which directly affected over a mile of stream channel and 230 acres of impounded wetland and upland area. Some of the sites completed in FY 2006 may be monitored in future year to determine treatment effectiveness.

**Monitoring Activities:**

**Woodtick Trail Wetland Restoration Monitoring**

In June 2004 the Forest, along with partners, completed the removal and recontouring of approximately 3,500 feet of the Woodtick Trail, which was a highly used unpaved road on the Walker Ranger District. This restoration project was the first of its kind on the Chippewa National Forest. The project resulted in approximately 20.8 acres of wetland restoration, 1.9 acres from the removal of the road prism itself and 18.9 acres of restored wetland hydrology. Monitoring of post-project site conditions have been carried out in FY 2005 and FY 2006. Additional monitoring is planned for FY 2007. The FY 2006 monitoring yielded the following results.

Vegetation

- Roughly 99% of woody species identified throughout the basins are facultative species or wetter.

- Narrow-leaved cattail was reported within the basins by the Forest Botanist in 2004, but it does not appear to be increasing in abundance (remains less than 5% of the overall cover). Narrow-leaved cattail can dominate and limit diversity in wetlands.
- Overall, cover for all three basins included in the project, including portions that were recently exposed after the road was removed, is roughly 95% native wetland vegetation.

#### Community Composition

- The overall percentage of obligate wetland species has changed little since 2005. However, some change in species composition has become evident during the last two growing seasons, particularly within the central basin. Tag alder continues to proliferate within the cattail and is slowly becoming the most dominant plant. One could assume that after the road was removed the water table dropped slightly and now supports more of a shrub wetland community.
- Emergent plants have increased in abundance (from less than 10% to nearly 25%) within open water of emergent wetland communities of the eastern and westernmost basins. Even submergent plants have become established and cover roughly 10-15% of open water.

#### Hydrology and Soils

- Soils continue to be saturated at or near the surface for a sufficient portion of the growing season. Drought conditions this summer have facilitated greater establishment of emergent and submergent species.
- Soils along the old road grade continue to build organic material naturally via decomposition and natural depositional patterns of surface water.
- Water continues to flow in a more natural course, one that would have existed prior to the road's construction. Channel formation and natural erosion from moving water has all but subsided and stabilized, allowing for vegetation establishment along previously bare depositional bars.

#### Woodtick Trail Wetland Restoration - Central Basin Photos:





**Lake Water Quality Monitoring:**

The Forest maintains a representative set of 10 lakes that are sampled at regular intervals to determine if there is a change in water quality over time. The Carlson Trophic State Index is a measure of the productivity of a lake. Trophic states of lakes are usually broken into four broad categories:

- **Oligotrophic:** TSI scores between 20 and 40. Low productivity lakes that have high transparencies (clear lakes), are often cold and deep, fishery is limited because of low productivity of plant community.
- **Mesotrophic:** TSI scores between 40 and 50. Moderately productive lakes, common in Minnesota, often support quality fishery.
- **Eutrophic:** TSI scores between 51 and 70. Highly productive lakes, experience frequent nuisance algal blooms, transparency is low, supports fishery.
- **Hypereutrophic:** TSI greater than 70. Extremely productive lakes, often clogged with vegetation, supports rough fish if any, highly subject to winter kill due to low oxygen levels, rare in Minnesota.

Lake Water Quality was monitored under the 1986 Forest Plan. Beaver, Adele, Caribou, Mabel, Webster, Lake Thirteen and Little Cutfoot Sioux Lakes have been monitored since the mid-1970s. In 1989, Big Rice and Lower Sucker Lakes were added to the monitoring program. Lakes are sampled three times during the open water season on an alternating schedule so that each lake is monitored every two to three years. Adele, Beaver, Caribou, Dixon (a 2004 addition), Little Cutfoot Sioux, and Round Lakes were sampled in 2006. See table 29. All of these lakes are exhibiting normal variability for water quality.

Data is stored in a local database and shared with Itasca County.

**Table 29:** Trophic State of Trend Lakes Sampled in 2006

Lake Name	TSI Score Pre-1980	TSI Score 2006	Trophic State
Adele	45.0	41.7	Mesotrophic
Beaver	39.2	40.1	Mesotrophic
Caribou	36.8	25.6	Oligotrophic
Dixon	52.5 (2004)	54.0	Eutrophic
Little Cutfoot Sioux	59.9	54.2	Eutrophic
Round	57.9 (1999)	60.8	Eutrophic

### Evaluation and Conclusions:

Monitoring results of management activities presented above and in other sections of this report show that Forest management is meeting the goal of maintaining or improving watershed conditions. Wetland vegetation, hydrology, and soils conditions are improving as desired in the Woodtick Trail project area. Water quality conditions in lakes on the Forest are not showing evidence of degrading.

### Recommendations:

Current monitoring efforts are providing the Forest with a good sense of the results of management activities. These monitoring efforts will be continued in the future. In addition, site specific monitoring of watershed improvements will be conducted in future years.

## **16. Soils**

### **Monitoring Question:**

Are the effects of Forest management, including prescriptions, resulting in significant changes to productivity of the land?

In FY 2006 the focus was on compaction and rutting.

### **Monitoring Driver – Desired Condition and Objectives:**

D-WS-12 Part of the Desired Condition states “There is minimal compaction, displacement and puddling.”

O-WS-9 Protect and restore areas where soils are adversely impaired and contributing to an overall decline in watershed condition, soil productivity, soil quality and soil function. Do this by using management practices, inventory and monitoring results and findings from the inventory of ecological units.

O-WS-10 During all management actions involving soil disturbance:  
One of the statements is, “Protect soil-hydrologic functions by minimizing rutting, puddling and compaction.

From the Voluntary Site-Level Forest Management Guidelines (MN Forest Resource Council, 2005):

Timber harvesting should be designed and conducted to achieve the following beneficial outcomes regarding soil productivity (the following applies to soil compaction and rutting):

- Majority of soil on site free from any compaction or traffic.
- Minimal rutting in skid trails, roads and landings; and avoidance of rutting in the general harvest area.

### **Background:**

In the past there have been concerns over the amount of rutting and compaction that occurs on a logging site. It is caused by heavy vehicles driving over a site during harvesting or site preparation. Soil compaction can affect tree productivity by reduced aeration and increasing the penetration strength for roots. Some research has shown that compaction can take years before it recovers to the pre-compaction levels.

Rutting is caused by the tires of heavy equipment, typically under wet soil conditions. Rutting can affect the hydrologic processes and the aeration of the soil.

Information from this monitoring can help determine if the Chippewa National Forest’s recommended mitigation measures, such as harvesting during frozen ground conditions, are affecting soil productivity.

Due to the heavier soil types and wet to moist soil conditions found on parts of the Chippewa National Forest, soil compaction and rutting are one of the concerns in regards to soil productivity. The other concerns which are scheduled for monitoring are the amount of slash remaining on low-nutrient sites, soil erosion and the effect of fire on soils.

**Monitoring Activities:**

The monitoring was done in Sept. 2006 by the Forest Soil Scientist, Forest Hydrologist and Hydrologic Technician. Sites were selected by using an ArcMap GIS project that was built using a Terrestrial Ecological Unit (soil) layer and a layer which showed recently harvested timber stands. Stands that are harvested on sandy soil were not included since compaction on sands are not as much of a concern as the heavier loam, silt or clay textures. Stands that were harvested under frozen soil conditions were also not selected. Clearcuts were selected since the number of passes with heavy equipment is more frequent as compared with other harvest methods.

The methodology used was to walk over the site and look for visual signs of rutting, puddling and compaction. Two sites were aspen clearcuts with aspen resprouting. One thing the monitoring team looked for was aspen sprouts as an indicator. Typically very few aspen will sucker where heavy compaction occurs, such as skid trails and landings. The number of ruts, as well as the depth and length of rut was also observed.

Two sites were chosen for monitoring, one on the Deer River District and one on the Blackduck District. There were signs of rutting at both sites but it was not considered detrimental according to Regional Forest Service standards. Although we were not focusing on soil erosion, we did record one area where soil had eroded on a skid trail. Waterbars were not constructed but slash was put over the trail. The landings and skid trails did not appear excessive in size.

During the 2006 field season, 4 other sites (3 on the Blackduck District, 1 in Walker) were monitored for compaction and rutting. However, they were conducted at the project level with the districts. Similar methods were used and the results were similar at those sites.

An Excel spreadsheet will be made which lists the stands that were monitored, what they were monitored for and what was found on the site.

**Evaluation and Conclusions:**

The methodology used is similar to Minnesota Forest Resources Council (MFRC). However, according to research done on the Chippewa and other Lake State forests by Aaron Steber, a graduate student from the University of Minnesota, visual cues for compaction may not be sufficient for a site evaluation.

The area of landings and skid trails were observed for excessive size, but not measured. When compaction is measured in the future, consideration should be made to actually measure the skid trails and landings. Region 9 standards do not specify the size of landings and skid trails, but limit the amount of detrimental soil disturbance to less than 15% of the site. The Minnesota Voluntary Site-Level Guidelines suggest no more than 1-3% for roads and landings.

**Recommendations:**

- Determine the percentage of area that is in landings and skid trails and compare to the size of harvest unit.
- Instead of visual cues as a measure of compaction, use a soil penetrometer, collect soil samples to calculate bulk density or observations of the changes in soil structure. When conducting these types of sampling strategies, it is important to follow a protocol, consistency should be maintained as much as possible and the sample size needs to be sufficient to avoid biased results. There are pros and cons to each type of sampling methodology and these should be understood and taken into consideration.
- Sample a percentage of the clearcuts on loamy soil types (or heavier) on each district. If possible, increase the sample size.
- Create a partnership with Itasca Community College, Bemidji State University or Leech Lake Tribal College to assist with choosing sites, gathering data, taking field measurements and analyzing data.
- Monitor other types of harvests, such as shelterwood cuts, select cuts and thinnings. Clearcuts should still be a priority due to the extent of area covered by harvest equipment.
- Site preparation should also be monitored for compaction and rutting.

**17. All- Standards and Guidelines, Mitigation Measures and Best Management Practices**

**Monitoring Questions:**

Monitoring and evaluation requirements will provide a basis for a periodic determination of the effects of management practices 36 CFR 219.11(d).

At intervals established in the plan, implementation shall be evaluated on a sample basis to determine how well objectives have been met and how closely management standards and guidelines have been applied. Based upon this evaluation, the interdisciplinary team shall recommend to the Forest Supervisor such changes in management direction, revision, or amendments to the forest plan as are deemed necessary (36 CFR 219.12(k)).

**Monitoring Driver:**

The monitoring done is in response to Monitoring Regulatory Requirements (monitoring questions) listed in Table MON-1, FP p 4-3.

**Background:**

Informal monitoring of Best Management Practices (BMPs) and standards and guidelines occurs at all phases of timber sale design, layout and implementation. Periodically more formal monitoring trips are scheduled that involve an integrated team of specialists and district personnel. In FY 2006, four timber harvest units were monitored to see how well the BMPs, standards and guides and Forest Plan objectives were met. The monitoring team consisted of integrated team including the planner, hydrologist, fisheries biologist, soil scientist, ecologist, NEPA coordinator, timber sale administrators, Operation and Implementation team leaders,

silviculturists and Monitoring , Inventory and Survey Team (MIST) members. Not everyone participated in all site visits.

Four sites were selected from lists submitted by the Districts. While not random, final site selections were not based on prior knowledge of the sites. The criteria were that the Decision Notice for the project was signed under the 2004 Forest Plan and harvest had been completed.

The team was briefed on the prescription and the mitigation measures applicable to each unit. Team members then spent time looking through the stands and met to jointly discuss findings.



There is no database available for storing this type of information. A more detailed report was compiled and is available upon request. A summary is provided here.

### **Monitoring Activities:**

#### **Site #1 – Walker Ranger District    Compartment 125    Stand 29**

This is a red pine plantation that was planted in 1962. The prescription was to thin the stand to an average basal area (BA) of 80 ft<sup>2</sup>/acre. Residual trees should be those with the best form and healthy appearance but not necessarily the largest diameter.

#### *Key Findings Site 1*

- The prescription called for thinning to an average BA of 80 ft<sup>2</sup>/acre. The resulting average BA in the stand, including all species, was greater than 80 ft<sup>2</sup>/acre. The prescription didn't specify as to whether that BA was for all species or for just the pine.
- The main trail into the stand was closer to the adjacent wetland than desired. However this was an existing and well established trail, so it was used rather than impacting a new area further away from the wetland. The team agreed that this was the least impactful option.
- There was clover at the landing site/trail entrance. The skid trails and landings were seeded and clover was not part of the seed mix. The clover probably migrated there from the roadside or there was a seed bank in the soil that germinated after disturbance.

- The stand was a mix of hardwoods and conifers resulting in quite a lot of diversity. The stand no longer looked like a “typical” plantation. The objectives for this stand met Forest Plan Objectives as well as standards and guidelines. Administration of the sale was excellent and the resulting condition of the stand was very good.

**Site #2 – Walker Ranger District    Compartment 155    Stand 6**

This is a 6 acre, 75 year old aspen stand with many uprooted and broken off trees. The prescription was to harvest using shelterwood harvest and then to underplant white pine.

Key Findings Site 2

- There wasn’t much in terms of merchantable wood taken from this site. Discussion by the team occurred on whether the harvest of the remaining trees helped or hindered the short and long term objectives for this stand which were for a mixed stand of aspen, pine, and spruce sawtimber. Prior to harvest the hazel brush was spotty. Since harvest there has been a lot of brush and aspen sprouting. Under-planting will be more difficult and more costly as a result of the harvest, though the silviculturist did say that it was still possible to plant and that planting would likely occur next spring.
- There was no written documentation and no recollection of discussion of the changes between the objective in the EA (shelterwood) and the final prescription (clearcut with reserves). Due to the condition of this particular stand (many uprooted and broken off trees at the time of implementation and very little merchantable wood harvested) there was probably little difference in effects between the shelterwood originally proposed and the clearcut that was implemented. During sale preparation and layout it was determined that the stand “was too old and thin” to add conifers through a shelterwood and the prescription was changed to a clearcut with residuals consisting of scattered pine and oaks.

**Site #3 – Blackduck Ranger District    Compartment 51    Stand 39**

This is an 8 acre, 70 year old aspen stand. The prescription was to harvest 6 acres of the stand using clearcut with reserves and regenerating back to aspen.

Key Findings Site 3

- There is an old road through the unit. The road goes closer to a wetland than desired, but the decision was made to use the existing road rather than create a new temporary road further from the wetland. The team agreed that this decision was the least impactful.
- There were two permanent wetlands within or directly adjacent to the unit. There were two short areas where there was greater than 20% soil disturbance in the filter strip, but there was no evidence of erosion or deposition in the wetlands.
- A user maintained road (non-system road) should be obliterated, but it couldn’t be accomplished under the timber sale contract because it was not used by the timber purchaser. Since the road wasn’t constructed as a result of the timber sale, leaving it in

place isn't a violation of BMPs or mitigation measures, but the team felt that an opportunity had been missed to economically obliterate the road while an operator with heavy equipment was on site.

- There was a lot of thistle on site. The unit was laid out in the winter so it isn't clear whether it was there prior to harvest or not. For the most part it isn't likely to persist.

**Site #4 – Blackduck Ranger District      Compartment 81      Stand 15**

This was a 43 acre balsam fir/aspen/paper birch stand that was approximately 40 – 50% dead and blown down. The prescription is to salvage the stand using clearcut with reserves, cutting aspen, balsam fir and birch and reserving all other species.

Key Findings Site 4

- The landing was not visible from the road.
- A small vernal pool had been skidded through, though the mitigation measure was to protect “some” not necessarily all of the seasonal ponds.



**Stick nest found during monitoring.**

- The stand appeared to be more like a sanitation/salvage or selection harvest than the idea of what a “typical clearcut” might be. The resulting stand is structurally and compositionally diverse. The unit looked very good in terms of the amount of snags, reserve trees and down woody debris remaining in the stand.
- A black-backed woodpecker nest was found during layout and a large reserve area was created around the nest. The sale administrator, operations team leader and marking crew were all aware of the black-backed woodpecker nest location and the area was well protected.
- During the monitoring visit a large stick nest was found at the edge of the unit. It was not detected in the stick nest survey and hadn't been detected prior to the monitoring visit, so it may well have been constructed after the harvest.

Findings Common to All Sites

- Activities were conducted within the seasonal restrictions for all four units.
- There was little or no damage to residual trees. In some units trees marked for harvest were left in order to protect residual trees.
- With one exception, there was little or no evidence of rutting and soils were well protected.
- All units had ample dead and dying trees left on site. It appears that large downed wood was retained on site if it was present before harvest.

**Summary Recommendations:**

- At Site #2 there was a change in the prescription between the environmental assessment and actual implementation. Due to the condition of this particular stand there was probably little difference in effects between the shelterwood originally proposed and the clearcut that was implemented, but it is important to have a functioning process in place for consultation with the interdisciplinary team and documentation for the record.
- If non-system roads are found in units, sale administrators should consult with the Forest Hydrologist or Ecologist to see if there are funds available to close or obliterate them. There may be ways to cost effectively remove roads and accomplish habitat or watershed restoration targets.
- The format that the Blackduck District uses for listing the mitigation measures, along with the prescriptions, is very effective and user friendly. The mitigation measures associated with that unit are directly tied to the prescription.
- The difficulty of identifying seasonal ponds during layout is a concern raised at most monitoring trips. Identifying and marking seasonal ponds particularly during the winter, is very difficult. In Landtypes or phases where seasonal ponds are likely, using the 1990 aerial photos would be helpful. These photos were taken in May prior to leaf out and many seasonal ponds are visible on the photos.

### **III. RESEARCH AND STUDIES**

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#### **1. Long-Term Soil Productivity Study**

As part of a national long-term soil productivity study, soil porosity and organic matter are being experimentally manipulated on large plots to determine the impacts of such manipulation on growth and species diversity of aspen stands on the Chippewa National Forest. Sampling five years after treatments occurred on the Ottawa National Forest in Upper Michigan in 1996 and on the Huron-Manistee, lower Michigan, in 1997. Research was done in two areas on the Chippewa National Forest. The first is on the Marcell Experimental Forest in the Marcell Moraine Land Type Association (LTA) and it was started in 1991. The second study area is on the Pike Bay Experimental Forest in the Guthrie Till Plain LTA. That treatment began in 1993.

Four test plots were prepared to determine the effects of soil compaction and organic matter removal on soil properties and growth of aspen suckers; associated species and herbaceous vegetation on stand development. On the Marcell and Chippewa sites, the study involved winter harvest of 70-year-old aspen growing on loamy sand with site index of 65. (Site index is used as an indicator of site productivity or quality; the higher the number, the more productive the site.)

The following treatments were applied to the sites:

- 1) whole tree harvest (trees lifted off the site with little or no ground disturbance from machinery)
- 2) soil compaction
- 3) forest floor removal and
- 4) soil compaction and forest floor removal.

After five growing seasons, numbers of suckers was extremely limited on the soil compaction areas. Mean diameter and height of regeneration was greatest on the whole tree harvest area. The treatment areas of soil compaction, forest floor removal or both all resulted in reduced biomass of foliage, stems, and total suckers to about one half of that produced on the whole tree harvest treatment. And, after five years, there was an abundance of saplings (>1 inch dbh) on the whole tree harvest area but few on the other treatment areas. Data collection (soil bulk density, soil strength, plant nutrient analysis and regeneration by species) continued in years seven and ten.

Sampling 15 years after treatments occurred on the Ottawa National Forest in Upper Michigan in 2006 and will begin on the Huron-Manistee, lower Michigan, in 2008. The 15th year sampling was completed in 2005 and 2006 for the Marcell study site. The vegetation is planned to be sampled for the 15th year at the Chippewa site in 2007 and the soil in 2008. The University of Minnesota will record the plant species in 2009 at the Chippewa site.

Northern Research Station located in Grand Rapids, Minnesota hired a post-doctoral researcher, Rick Voldseth, to summarize the 10-year data. Rick's 10 year summary is expected in the summer of 2007. In September 2006, Rick presented his preliminary findings during an office

presentation and field tour to the Chippewa National Forest and other interested agencies. Other than personal communication, preliminary results are not available at this time.

## **2. Soil Compaction Monitoring**

Aaron Steber, a graduate student from the University of Minnesota - St. Paul, conducted a study to observe the degree of soil compaction from recently harvested timber on selected sites within the Chippewa National Forest. His research was funded by a study to look at methods to sample soils at FIA plots. Half of the sites were on loamy, fine-textured soils and half were on sandy, coarse-textured sites. In 2004, Aaron looked at the relationship of soil compaction and soil texture. In 2005, he looked at the relationship of soil compaction and landscape features. Preliminary results suggest that heavier textured soils are more susceptible to compaction and using only visual criteria for determining soil compaction may not relate to the actual degree of compaction on the site. Aaron subsequently authored *Surface Compaction Estimates and Soil Sensitivity in Aspen Stands of the Great Lake States* that summarizes the results of his research in 2004 and 2005. This paper verifies his preliminary findings. In March, 2007, Charles Perry presented a summary of Aaron's work at a March, 2007 Wisconsin Society of American Foresters Conference.

## **3. Releve Vegetation Monitoring**

During the fall of 2005, discussions began with a Bemidji State University graduate student, Jeanne Ring, and her advisor, Mark Fulton to re-sample vegetation on permanent 10 X 10 meter releve plots within the Chippewa National Forest. Jeanne collected data from 18 plots during the 2006 field season. She is currently analyzing that data and expects to have her results in the fall of 2007.

Objectives for the monitoring include:

- To evaluate the vegetation / soil effects of different harvesting techniques.
- To evaluate the effects of fire on the vegetation and surface soil layer.
- To observe successional pathways – without disturbance.
- To observe successional pathways with different types of disturbance.
- Use the information about the successional pathways and vegetation dynamics in the Terrestrial Ecological Unit interpretations.
- Monitor the effects of noxious weeds, earthworms or other invasive species.
- Establish productivity ratings for ecological units.

## **4. Goblin Fern (*Botrychium Mormo*)**

Goblin fern, *Botrychium Mormo*, is a small species of moonwort found in rich hardwood forests in the northern portions of Minnesota. It is a Regional Forester Sensitive Species for Region 9. The "Conservation Approach for Goblin fern, *Botrychium Mormo* W.H. Wagoner" was completed December 2001.

One of the information needs identified for the Goblin Fern was to investigate the response of this species to changes in overstory vegetation and winter logging as would occur in some typical forest management practices. One of the known colonies of goblin fern on the Forest was chosen. The site selected for this study is south of Lower Sucker Lake (Township 144 North,

Range 30 West, Section 3), where goblin fern colonies occur on either side of Forest Road 2135. The colony on the west side of the road (14 acres) was chosen as a control and the east side (17 acres) was chosen for treatment of a typical hardwood management practice. During 1995, both sites were extensively searched for goblin ferns and each plant location was marked. Plot data was taken in 1995 and has continued through 2005. A timber harvest contract was awarded to implement the treatment. About 1/3 of the treatment stand was harvested early winter in 2006, but operations were suspended due to excessive soil disturbance. The remainder of the treatment is scheduled for winter 2006-2007. Plot data will continue to be collected until the treatment occurs, and post treatment plot data will be collected for a number of years, depending on the extent of the response and confidence in the results.

## **5. Red Pine Retention Study**

North Central Research Station is conducting this study in cooperation with the Chippewa National Forest and University of Minnesota. The study area is located in the Tamarack Point area on the Deer River District which is administered by Joseph Alexander. Since its implementation, this project has gained national and international recognition and interest.

In currently managed, naturally regenerated and planted red pine stands, there is minimal variation in structure and composition relative to historic conditions. The study is designed to create red pine stands that more closely represent past ecosystems. This study uses partial harvests to reduce stands to the same basal areas but leaves remaining overstory trees in different spatial patterns on the landscape. The patterns include large gaps, small gaps, and traditional, evenly spaced thinning. Jack, red and eastern white pine were planted in the understory to increase structure and composition. The varying spatial patterns and densities of the overstory will be compared to the effects on growth and survival of regeneration, understory composition, site productivity, avian communities and disease incidence.

Results will be monitored for 5+ years after treatment. Logging began in August 2002 and was completed in April 2003. Planting was done in May 2003. Some ecosystem burning was also done in fall 2003. Data collection occurred in 2003 and 2004 and is planned for a number of years. Preliminary results are not yet available. Researchers have hosted several field trips to the site to discuss the study objectives, methodology, and data collection.

The Big Lake Management Plan Environmental Assessment covered this study (1999). The establishment report and study Plan is *Restoring Stand Complexity in Managed Red Pine (Pinus resinosa) Ecosystems Using Overstory Retention and Understory Control*, (Palik, Zasada, and Kern, 2003). The design and implementation of the project has involved the expertise and commitment of numerous resource professionals on the Chippewa Forest, especially on the Deer River and Blackduck Districts, and from North Central Research Station, University of Minnesota, and State and Private Forestry. It continues to draw the attention and interest of researchers and natural resource professionals across the country and even internationally.

## **6. Monitoring by the Minnesota Dept. of Natural Resources and the Minnesota Forest Resources Council**

There was no site-level forest management guideline monitoring done by the MDNR on the Chippewa National Forest in 2006. Some sites were selected on the Superior National Forest.

There will be no monitoring done statewide for the year 2007. It is expected that monitoring will resume in 2008.

## **IV. ADJUSTMENTS OR CORRECTIONS TO THE FOREST PLAN**

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Since the Chippewa National Forest Land and Resource Management Plan (Forest Plan) was revised, Congress has enacted the 2005 Planning Rule which allows us to make non-substantive corrections or adjustments to the revised Forest Plan using a process called “administrative corrections”. Administrative corrections (36 CFR 219.7(b)) may be made at any time and are not plan amendments or revisions. Administrative corrections include the following:

- (1) Corrections and updates of data and maps,
- (2) Corrections of typographical errors or other non-substantive changes;
- (3) Changes in the monitoring program and monitoring information
- (4) Changes timber management projections; and
- (5) Other changes in the Plan Document or Set of Documents, except for substantive changes in the plan components.

There were no administrative corrections made during FY 2006. During FY 2005, there were seven and some corrective changes. The full corrections as well as the corrected pages from the set of Plan documents can be found at:

[http://www.fs.fed.us/r9/forests/chippewa/projects/forest\\_plan/index.php](http://www.fs.fed.us/r9/forests/chippewa/projects/forest_plan/index.php).

We will likely issue additional administrative corrections in the future. These will be available on the website above and we encourage people to use this resource for accessing the most up to date information on administrative corrections. Future corrections will also be listed in the Chippewa NF Schedule of Proposed Actions which is distributed quarterly. We will continue to provide opportunity for public involvement at the project level and during any substantive changes to the Forest Plan.

There have been no amendments to the revised Forest Plan.

## V. LIST OF PREPARERS

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The following people collected, evaluated, or compiled data for the FY 2006 Monitoring and Evaluation Report:

Name	Discipline
Brenda Halter-Glenn	Forest Planner
Sharon Klinkhammer	Forest NEPA Coordinator
Gary Swanson	Forest Silviculturist
Cindy Miller	Timber Specialist
Millie Baird	Engineer
Lori Larson	Timber Resource Specialist
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Jim Barott	Soils Scientist
Frank Polich	Forest Engineer
Alan Williamson	Forest Ecologist
Kay Getting	Public Affairs Specialist
Ann Long-Voelkner	Recreation Planner
Leo Johnson	Blackduck NEPA Coordinator
Luke Rutten	Forest Hydrologist
Chantel Cook	Fisheries Biologist
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Ray Newman	Forest Botanist